IDENTIFICATION OF THE PRECIPITATING FACTORS FOR RECURRENT MYOCARDIAL INFARCTION, AT SELECTED SETTING, CHENNAI, 2015.

DISSERTATION SUBMITTED TO

THE TAMIL NADU Dr. M.G.R MEDICAL UNIVERSITY

CHENNAI

IN PARTIAL FULFILMENT OF REQUIREMENT FOR THE DEGREE OF

MASTER OF SCIENCE IN NURSING

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Internal Examiner:

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LIST OF ABBREVIATIONS

ACS	-	Acute Coronary Syndrome
AHA	-	American Heart Association
AMI	-	Acute Myocardial Infarction
BB	-	Beta Blockers
BMI	-	Body Mass Index
CAD	-	Coronary Artery Disease
CHD	-	Coronary Heart Disease
C.I	-	Class Interval
CREATE	-	Treatment and outcomes of ACS in India
CVA	-	Cerebro Vascular Accident
CVD	-	CardioVascular Disease
DALYs	-	Disability Adjusted Life Years
DM	-	Diabetes Mellitus
FLL	-	Frontier Life Line
HT	-	Hypertension
IHD	-	Ischemic Heart Disease
LMIC	-	Low and Middle Income Countries
MI	-	Myocardial Infarction
MONICA	-	Monitoring of Trends and Determinants in Cardiovascular Disease
MB-CK	-	MyogloBin CreatinKinase
NCD	-	Non Communicable Disease
NSTEMI	-	Non ST Segment Elevation Myocardial Infarction
OPD	-	OutPatient Department
PREMISE	-	Prevention of Recurrence of Myocardial Infarction and StrokE
RHD	-	Rheumatic Heart Disease
SES	-	Socio Economic Status
SS	-	Systemic Sclerosis
STEMI	-	ST Segment Elevation Myocardial Infarction
US	-	United States

WHO	-	World Health Organisation
YLD	-	Years Living with Disability

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ABSTRACT

A case control study to identify the precipitating factors for recurrent Myocardial Infarction at selected setting, Chennai.

Aim and objective: To identify the significant precipitating factors for recurrent myocardial infarction(MI) at selected setting, Chennai. **Methodology:** A non-experimental design, retrospective approach was chosen to identify the precipitating factors for recurrent MI at selected setting, Chennai. Patients with incident and recurrent MI who fulfilled the inclusive criteria were selected as samples using non-probability purposive sampling technique. Demographic details and precipitating factors were assessed using structured interview schedule and record reviews. **Result:** The study findings identified significant precipitating factors for recurrent MI such as episodes of anginal pain after thrombolysis, Non ST elevation MI, Non-Transmural infarction, central obesity, chronicity of Diabetes Mellitus(DM), history of Cerebro Vascular Accident (CVA), family history of dyslipidemia, interrupted sleep pattern, night shift, duration of sleep and non-vegetarian diet. **Conclusion:** The research investigator identified significant precipitating factors for recurrent MI and developed a criteria to assess MI clients for creating awareness among MI survivors about the importance of secondary prevention.

Keywords: *incident MI, recurrent MI, precipitating factors, secondary prevention,*

INTRODUCTION

One in every two patient with first episode of Acute Coronary Syndrome (ACS) develops recurrent ischemic event in their life time. Although recent advances in reperfusion treatment, which was considered as one of the major breakthrough in the field of cardiovascular medicine has contributed to better short-term outcomes,it has become crucial to restore cardiac function for better long term outcomes. By 2030, it is expected that the incidence of MI will increase by 16.6% compared with 2010 making skill full care and evidence based preventative measures key among efforts to reduce the increasing prevalence of MI and its recurrence.**(Advances in MI management, June 2013)**

OBJECTIVES

To associate the selected factors such as clinical prognostic factors, genetic factors, life style factors and dietary factors between the case and control group.

To identify the significant precipitating factors for recurrent Myocardial Infarction among the group.

METHODOLOGY

Research Design

Non experimental research design, retrospective approach case control study.

Variables

Research variable

Precipitating factors for recurrent Myocardial Infarction such as clinical prognostic factor,genetic factor, lifestyle factor and dietary factor.

Setting

Case group & Control group – Cardiac OPD in Frontier Life Line hospital, Mogappair, Chennai.

Population

Target population

The target population consisted of all patients with medical history of recurrent MI as case group and incident MI as control group.

Accessible population

All patients attending OPD's of Frontier Life Line hospital with medical history of recurrent MI as cases and incident MI as controls.

Sampling

Non-probability purposive sampling technique was used to select 117 patients as samples who fulfilled the inclusive criteria as samples from Frontier Life Line hospital

Measurement and tools

The precipitating factors for recurrent MI was identified using structured interview schedule & record reviews.

RESULTS

The study findings revealed that there is significant association between case and control group with various factors predisposing to develop recurrent MI. The identified precipitating factors included

- Clinical Variability factors - chronicity of DM and HT, episodes of angina pain, NSTEMI, non-transmural infarction, body mass index, central obesity and co-morbidity (respiratory, renal disease & CVA)
- Life Style factors – smoking & its cessation, alcohol intake, duration of sleep and sleep pattern, working hours and night shift
- Genetic factors – Paternal &maternal history of dyslipidemia, paternal, maternal and sibling history of HT and paternal history of heart disease.
- Dietary factors – Non-vegetarians, consumption of non –veg foods like chicken. Mutton & fish

The factors identified to be protective against risk of recurrent MI includes,

- Rehabilitation programme
- Habit of doing exercise and longer duration of exercise
- Intake of green leafy vegetables

DISCUSSION

The findings revealed the precipitating and protective factors of recurrent MI which aids in developing assessment criteria for MI clients.

Implication for clinical practice

Nurses working in health care units should be aware of these precipitating factors in assessing MI clients for risk of developing recurrent events. Nurse educators/administrators should arrange health education sessions in hospitals and community health center to create awareness and educate public about the importance of secondary prevention of MI.

CHAPTER 1

INTRODUCTION

INTRODUCTION

Non Communicable Diseases (NCDs) are chronic diseases with generally of long duration and slow progression. The four top most NCDs are cardiovascular diseases (like heart attacks and stroke), cancers, chronic respiratory diseases (such as chronic obstructed pulmonary disease and asthma) and diabetes. Low and Middle-Income Countries (LMIC) are already affected, where nearly three quarters of NCD deaths- 28 million occur every year. CardioVascular Diseases (CVD) account for most NCD deaths, or 17.5 million people annually, followed by cancers (8.2 million), respiratory diseases (4 million), and diabetes (1.5 million). These 4 groups of diseases account for 82% of all NCD deaths. Tobacco use, physical inactivity, the harmful use of alcohol and unhealthy diets all increase the risk of dying from a NCD, of these CVDs rank the highest. **(WHO Fact Sheet, 2012)**

Heart and blood vessel disease also called cardio vascular disease includes numerous problems, many of which are associated to a process called atherosclerosis. Atherosclerosis is a condition that develops when a substance called plaque builds up in the walls of the arteries. This buildup narrows the arteries, making it harder for blood to flow through and eventually grow or rupture to occlude the arteries. When atherosclerosis occurs in coronary arteries it is termed as Coronary Artery Disease (CAD). The most common types of cardiovascular diseases are coronary artery disease, congestive heart failure, cardiomyopathies, arrhythmias, myocardial infarction, valvular disease and peripheral vascular disease.

1.1 BACKGROUND OF THE STUDY

For more than a decade, CVD has become the distinct cause of death worldwide and 17.3 million deaths were reported **(World Heart Federation, 2008).** According to the Global Burden of Disease estimates 68% of the 751 million years Living With Disability (YLD) worldwide is attributable to NCDs, and 84% of this burden of NCD disability arises in LMICs. CVDs are responsible for 151 million DALYs, of which 62 million are due to coronary heart disease.**(Cardiovascular Disease Prevention and Control – Global Atlas WHO 2011).**

Cardiovascular disease continues to cause as large proportion of deaths and disability in and places a substantial burden on the health care systems and economies. The overall picture, and the distribution of the burden, continues to evolve in LMIC. There have been major improvements in recent years on many measures of cardiovascular disease; however, these improvements have not been universal, and substantial inequalities persist.

Table 1.1.1 Number and percentage of deaths from cardiovascular diseases world wide

Gender & age	CVD (Total)		CAD (Total)		Other CVD(Total)	
	No.	%	No .	%	No.	%
Male: Total deaths (all ages)	18,62,004	42	8,76,478	20	5,53.569	12
Premature deaths - before age 75	9,46,280	37	4,77,833	18	2,64,833	10
Premature deaths - before age 65	5,08,228	31	2,53,734	16	1,58,939	10
Females Total deaths (all ages)	22,22,657	51	9,05,706	21	6,85.312	16
Premature deaths - before age 75	5,44,769	38	2,37,673	16	1,49,314	10
Premature deaths - before age 65	2,02,175	27	77,477	10	69,776	9
Total deaths (all ages)	40,84,661	46	17,82,184	20	12,38,881	14
Premature deaths - before age 75	14,91,049	37	7,15,506	18	4,14,147	10
Premature deaths - before age 65	7,10,403	30	3,31,211	14	2,28,715	10

(Source: WHO mortality database, 2013)

According to WHO report, the current age standardized CVD mortality rates among males and Females in India (per 100,000) are 363-443 and 181-281 respectively **(Cardiovascular Disease Prevention and Control, WHO 2011).** In Tami Nadu, the mortality rate was high in the country due to CVD that is 360-430 per lakh population. The state suffers from DM, HT and overweight with variable percentage of population. . **(The Hindu, 2013)**

Another report states that mortality rate of about 24 percent in rural Tamil Nadu are due to CAD **(Centre for Technologies in Public Health, 2011).** The prevalence of CAD according

to the Chennai Urban Population Study was 11%. This was a drastic increase from 2% in 1970. (**Viswanathan. M et al 2001).**

CAD mortality and risk factor surveillance in India is very primitive and no organized system exists in rural as well as urban populations. Acute Coronary Syndrome (ACS) is the most common reason for hospitalization. Myocardial Infarction (MI) which can be ST segment Elevation Myocardial Infarction (STEMI) or Non ST segment Elevation Myocardial Infarction (NSTEMI) is the most common cause of morbidity and mortality worldwide. In US about 1.1 million cases occur every year with about 30% mortality and more than 50% of deaths occuring on the way to the hospital. In India, 31.7% of deaths are due to MI **(Shraddha Chauhan and Bani Tamber Aeri, 2013).**

Table 1.1.2: Forecasting the number of cases (males and females) of Coronary Heart Disease (CHD) in India.

Year/ area 2015	20 - 29yrs	30 - 39yrs	40 - 49yrs	50 - 59yrs	60 -69yrs	Total
Urban	8,167,924	7,927,846	8,493,463	6,156,089	5,346,975	36,092,297
Rural	2,324,087	4,523,697	5,816,588	6,852,050	5,913,624	25,430,046
Total	10,492,011	12,451,542	14,310,051	13,008,140	11,260,599	61,522,343

(Source: International Journal of Scientific and Research Publications, October 2013)

Most MI occurs in people over 50 yrs and become more common with increasing age. Sometimes younger people are also affected. An MI is more common for men than women. MI can also occur in people who have a past history of heart disease such as angina. It also happen "out of blue" in people of all cases and deaths.

Table 1.1.3: ACS in INDIA

Source	ACS		Mean age Yrs
	STEMI	NSTEMI	
CREATE (Treatment & outcomes of ACS in India)	61%	39%	57
Global Registry of Acute Coronary Syndromes	30 – 40%	60-70%	64-69
European Heart Surveys	42%	51%	63
US National Registry of myocardial infarction	---	----	68

(Source: Indian ACS registry – CREATE, Xavier et al 2011)

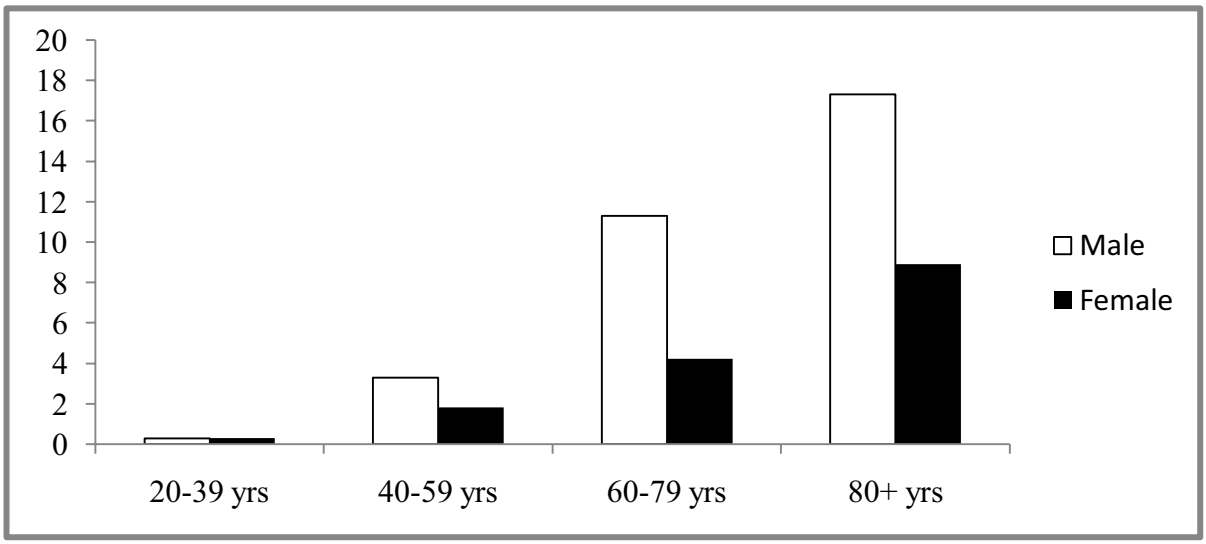


Figure 1.1.1 Prevalence of MI by age and gender

(Source: National nutrition and health examination survey 2009-2012, American Heart Association)

Risk factors are conditions or habits that increase the risk of acquiring a disease condition. Similarly CAD risk factors increase the risk of MI. These risk factors also increase the chance that existing CHD may worsen. The distribution of risk factors varied significantly between women and men controls.

Table 1.1.4: Risk factor burden related to MI between men and women

Risk factors	Odds ratio	
	Male	Female
Apo lipoprotein B/A_1 ratio	3.30	2.87
Smoking	2.86	3.04
Hypertension	2.95	2.32
Diabetes mellitus	4.26	2.67
Abdominal obesity	2.26	2.24
Psychosocial	3.49	2.58
Physical inactivity	2.07	1.30
Alcohol intake	2.42	1.13
High risk diet	1.78	1.68

(Source: European Heart Journal, 2009)

Patients with an ACS continue to represent a major health concern. The rate of ACS recurrence in this group remains relatively high. These patients with a recurrent ACS have worse outcomes, however, the timing of these adverse outcomes and the contributing factors, remain unexplored.

Recent clinical studies suggest a residual rate of recurrent events of approximately 10% per annum after an initial ACS event, with most of these events occurring after discharge from hospital. **(American Heart Association 2013).**

1.2 SIGNIFICANCE AND NEED FOR THE STUDY

There are 32.4 million myocardial infarctions worldwide every year. Patients with previous myocardial infarction (MI) are the highest risk group for further coronary events. Survivors of MI are at increased risk of recurrent infarctions and have an annual death rate of 5% - six times that in people of the same age who do not have CHD.

(Source: Prevention of Recurrences of Myocardial Infarction and StrokE (PREMISE) country project, 2005)

The **WHO MONICA (**Multinational MONItoring of Trends and Determinants in CArdiovascular Disease**) Study**, monitored trends in CHD across 38 populations in 21 countries over 10 years. Data from this study indicate that secondary prevention and changes in coronary care are strongly linked with declining coronary end-points.

Secondary prevention is detecting the disease in the early stages and implementing intervention before symptoms develops. These intervention are very much cost effective and its implementation at a large scale will definitely have an influence on life expectancy. **Marmot review (2010)** identified that one of the most effective ways to reduce the gaps between life expectancy and health outcome is secondary prevention.

Secondory prevention warrants following action:

- Appropriate coverage of vital secondary preventive interventions and procedures
- Cost effective systematic screening
- Control of HT, cholesterol & DM
- Secondary prevention as a part of broader strategy for public health
- Community & voluntary sector gaps to render services for patients who are not covered by mainstream health services.

Secondary prevention of CAD by widespread risk factor modification reduces mortality, decreases subsequent cardiac events, and it also improves the quality of life. Risk factor modification plays a vital role in secondary prevention.. Therapeutic lifestyle changes includes,

- Physical activity:

An important component of secondary prevention of CAD is regular physical activity. It helps in increasing the exercise capacity and in treating co morbid risk factors, thereby improves quality of life. Compared with usual care exercise-based cardiac rehabilitation has shown a reduce in recurrent event and cardiac mortality

- Weight and dietary management:

The American Heart Association (AHA) recommends measuring BMI at each visit, followed by a objective feedback and counseling on weight reduction strategies. Balance of physical activity and moderation of caloric intake helps in achieving long-term weight maintenance.

- Tobacco Use:

Cessation of smoking after a myocardial infarction (MI) reduce the risk of recurrence by at least one third, and is as beneficial as modifying other risk factors.

All the above mentioned factors are universally recommended by evidence-based guidelines **(Scott and Todd 2010)**

Bruce and Susan (2015) conducted a study to investigate the association between central fat distribution and the risk of recurrent coronary events among a cohort of female MI survivors. Participants included 356 women (mean ± SD age, 55 ± 8.71 years) discharged alive after an incident MI from hospitals in Erie and Niagara (New York) Countries between 1996 and 2004. Interviews and self-administered follow-up surveys were used to collect pertinent information. Eighty-five women experienced a recurrent cardiovascular event. Using Cox proportional hazards analyses, the crude model for body mass index suggested that after incident MI, women had a 39% risk of a recurrent CVD event. Central fat distribution appeared to be better predictor of recurrent cardiovascular events when compared with body mass index

Marmor Alon., Sobel.E.Burton and Robert (2012) conducted a prospective study in UK to identify the factors presaging recurrent MI. Serial MB CK and myoglobin determinations and continuous electrocardiographic recordings was obtained from 200 consecutive patients with acute MI for 14 days, and serial radioventriculograms were obtained in selected patients Logistic regression analysis indicated that obese women with initial subendocardial infarction and repeated episodes of prolonged chest pain had a high probability rate (60 percent) of recurrence in contrast to the low probability (2 percent) in patients without these features. Thus early recurrent infarction is frequent after subendocardial infarction and is associated with a marked

increase in mortality. These results suggest that patients with subendocardial infarction are at particularly high risk for recurrent infarction and that patients with this type of infarction require vigorous monitoring and prolonged surveillance.

Cheng ka-on (2013) conducted a meta analysis of randomized control trials in China on the effect of early patient education on recurrent myocardial infarction . Patients who received early patient education showed a reduction of recurrent MI risk by 3% to 100%; the summarized relative risk of the interventional group was 0.80 compared with the control group. This means there resulted a 20% reduction in recurrent MI. Early patient education was shown to have a positive effect on the prevention of recurrent MI in this meta-analysis.

Vinay and Prasanna Lakshmi (2014) conducted a hospital-based case-control study of patients with a first MI in Mangalore, India, primarily to assess the relative importance of the risk factors for recurrent ischemic events. A total of 100 cases and 100 age and sex-matched controls were taken into this prospective case-control study from Intensive Coronary Care Unit. Prevalence of the following risk factors for MI such as age, sex, diet, smoking, alcohol consumption, history of hypertension, history of diabetes mellitus, and lipid profile were studied. Patient data were extracted from the medical records department and by interview. The result suggested that the most important predictor was high low-density lipoprotein, history of hypertension and overt diabetes mellitus.

Tahereh et al (2011), conducted a retrospective study among 1283 MI patients who were hospitalized in Tehran Heart Center from March 2005 to March 2006 were followed up in March 2008. Demographic, clinical and Socio economic status data were collected from case records and by telephone interviews. Multiple logistic regression analysis was performed to estimate the predictive effect of socioeconomic factors on outcome. The result from all 664 patients studied: Of these, 500 patients were alive and 164 were dead due to MI. The results of regression analysis showed that in addition to treatment, having diabetes or hyperlipidemia, socioeconomic variables including living area in square per person, unemployment and education were the most significant contributing factors to increased recurrent event after incident MI.

The findings from the above studies and investigator's experience in handling patients who had recurrent MI in cardiac ward and intensive care unit, made the researcher to realize the importance of secondary prevention. The researcher understood the need to develop an assessment criteria for MI patients to identify their risk of developing recurrent events. By assessing the risk, the nurses in the hospital and community areas will be able to create awareness about secondary prevention which in turn can reduce further complication and mortality among MI survivors.

1.3 STATEMENT OF THE PROBLEM

A Case Control study to identify the precipitating factors for recurrent Myocardial Infarction in selected setting, Chennai.

1.4 OBJECTIVES

1. To associate the selected factors such as clinical prognostic factors, genetic factors, life style factors and dietary factors between the case and control group.
2. To identify the significant precipitating factors for recurrent Myocardial Infarction among the group.

1.5 OPERATIONAL DEFINITIONS

1.5.1 Case

It refers to individuals with medical history of recurrent (repeated episodes) MI after 28 days of incident MI

1.5.2 Control

It refers to individuals with medical history of incident (first episode) of MI without recurrence for atleast one year.

1.5.3 Precipitating Factors

It refers to characteristics or conditions that increase the possibility for recurrence of MI using a structured interview schedule. The factors are

1.5.3.1 Clinical prognostic factors:

The factors include body mass index, central obesity, revascularization procedure, type and location of infarction, episodes of anginal pain after thrombolysis, Diabetes Mellitus, Hypertension, history of co-morbid illness, dyslipidemia, compliance to drug therapy and participation in rehabilitation program.

1.5.3.2 Genetic factors

The factors include family history of heart disease, hypertension, Diabetes Mellitus and Dyslipidemia.

1.5.3.3 Life style factors

The factors include habit of smoking and alcohol, nature of work, sleep pattern and exercise pattern.

1.5.3.4 Dietary factors

The factors include type of food intake, frequency and type of non-vegetarian foods, salt and sugar intake, consumption of fruits and vegetables, cooking style, intake of fried and preserved foods.

1.5.4 Myocardial Infarction

Injury and death of heart muscles caused by obstruction of blood flow due to blood clot or fat deposition leading to impaired cardiac functioning.

1.6 RESEARCH HYPOTHESES

RH_1: There is a significant association of selected factors such as clinical prognostic, genetic, life style and dietary factors between the case and control group.

RH_2: There are significant precipitating factors for recurrent Myocardial Infarction among case and control group.

1.7 DELIMITATIONS

The study was delimited to a period of four weeks

1.8 CONCEPTUAL FRAMEWORK

A conceptual framework or model refers to interrelated concepts gathered together in a rational scheme by virtue of their relevance to a common theme that propose a framework for conducting research.

The investigator adopted the conceptual framework based on **Betty Neumans System Model,** which was used to identify the precipitating factors for recurrent MI. The dynamic interaction between person and their environment was clearly depicted in the model

Basic Core Structure

Determinants include physiological, developmental, spiritual factors and socio-cultural factors. Which are distinct to each individual were explained under the basic core structure. This component of the model also discusses the response to the stressors by the individual and aids them to cope up with these stressors.

The core structure of the model represent men and women who are medically diagnosed with incident & recurrent MI of age between 30-70 years for control and case group respectively.

Stressors

Stressors are factors or a stimulus that disrupts response or manipulate the body's equilibrium.

Both groups may or may not be exposed to various risk factors of recurrent MI like diabetes mellitus, hypertension, central obesity, non ST elevation MI(NSTEMI), non transmural infarction, smoking, alcoholism, co-morbid illness, angina pain after thrombolysis and family history of heart disease and dyslipidemia.

Line of resistance

Line of resistance is a broken line, which acts only when the normal line of defense could not cope up with the stressors leading to alteration in normal health pattern. The line of resistance helps to facilitate coping and overcome the stressors which affects the individual.

The line of resistance of this model in case group indicates patient with all or some precipitating factors for recurrent MI like anginal pain after thrombolysis, NSTEMI, non transmural type of infarction , central obesity, co-morbid illness, etc.

In control group there is an absence of all or some of these precipitating factors.

Normal line of defense

It operates in consistent with a state of wellness. It is the response of the patient when exposed to any stressor. The normal line of defense is considered as the essential element of health in the health continuum.

For case group, normal line of defense is they seek health care support monthly once or quarterly due to their repeated episodes of MI and related management.

The normal line of defense for control group involves yearly follow up care.

Flexible line of defense

Flexible line of defense involves the body's coping mechanism which helps to overcome the stressors/stressful situations thereby assist in achieving a state of equilibrium in the patients system.

In case group the patient is unable to manage the stressors and hence developed recurrent MI.

In control group the patient, by modifying the risk factors attains a sense of stability, which eliminates the risk of developing recurrent MI.

Degree of reaction

The end result of stressors and coping mechanism adapted by the line of resistance is termed as the degree of reaction. Depending on the patients reaction towards stressors and degree of reaction, the results may be positive or negative.

In case group, due to changes in the determinants the patient developed recurrent MI.

In control group, the patient did not develop recurrent MI.

Secondary prevention

Secondary prevention aims at eliminating the factors which have resulted in alteration in health.

In secondary prevention the investigator recommends identification of precipitating factors for recurrent MI, by developing assessment criteria for MI clients. These assessment criteria could be used for regular screening for MI clients.

Tertiary prevention

Tertiary prevention focuses on rehabilitation, thus helps in strengthening patient's core structure after being exposed to stressors and experiencing ill effects of it. Its central purpose is to prevent recurrence of MI.

The investigator recommends intense secondary prevention programme to prevent further recurrence of MI and its complication.

It is therefore evident that this conceptual framework based on Betty Neuman's System model is appropriate for this study.

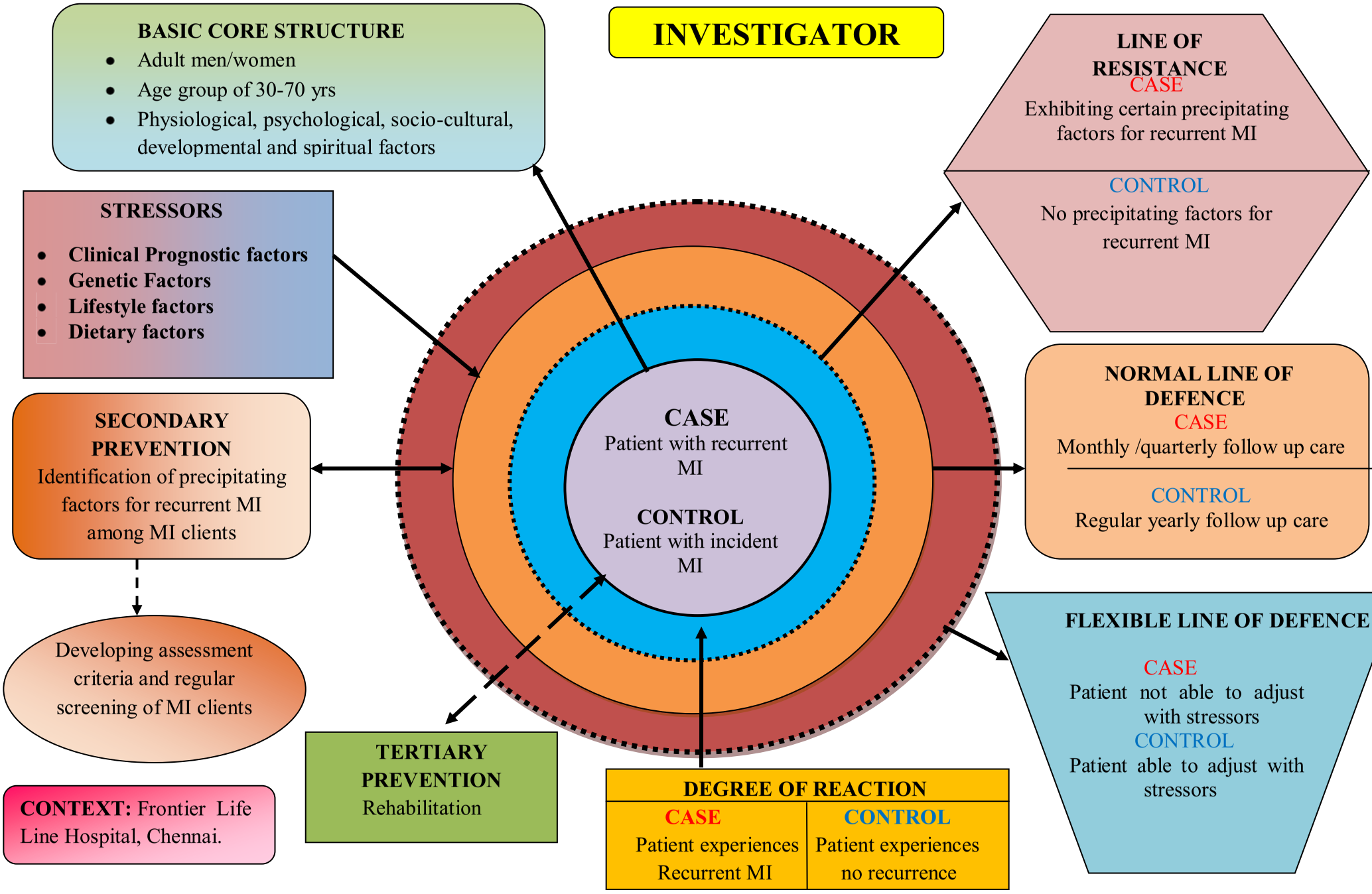


FIG 1.8.1 CONCEPTUAL FRAMEWORK BASED ON BETTY NEUMAN'S SYSTEM MODEL

1.10 OUTLINE OF THE REPORT

Chapter 1 : Deals with the background of the study, need for the study, statement of the problem, objectives, operational definitions, research hypothesis, assumptions, conceptual framework and delimitation of the study.

Chapter 2 : Contains review of literature.

Chapter 3 : Presents the methodology of the study and plan for data analysis.

Chapter 4 : Focuses on data analysis and data interpretation.

Chapter 5 : Enumerates the discussion of the study

Chapter 6 : Gives the summary, conclusions, implications, recommendations and limitations.

The study report ends with selected references and appendices

CHAPTER 2

REVIEW OF LITERATURE

REVIEW OF LITERATURE

Review of literature is a extensive, exhaustive and systematic examination of publications relevant to the research project which contributes to the new knowledge, insight and scholarship of the researchers. The major goal of a good review of literature is to develop a strong knowledge base to carry out a quality research.

This review of literature was done using the key words such as incident MI, recurrent MI, precipitating factors for recurrent MI, protecting factors against recurrent MI, secondary prevention, complications of MI, clinical factors for recurrence, life style factors, genetic factors and dietary factors. This review was done via standard databases such as COCHRANE library, CINAHAL, Google Scholar, MEDLINE, PubMed, and other unpublished studies from dissertations. It includes cross-sectional surveys, case-control studies, cohort studies, longitudinal prospective studies systematic reviews, randomized controlled trials (RCTs) and experimental studies that assess the risk factors for recurrence of MI. Out of 63 studies identified from the above databases, 43 were relevant to the research topic. Among the selected 43 studies 7 were Indian literatures and 36 were International studies. The relevant reviews were organized as follows:

SECTION 2.1: Scientific reviews related to precipitating factors

2.1.1 Scientific reviews related to clinical prognostic factors

Time trends in incidence & fatality in various age and gender groups are of profound interest and analysis of these factors makes us to understand the vitality of secondary prevention. **Sulo.G et al (2009)** while examining the trends of recurrence rate, found that incidence and mortality due to recurrence increases greatly with age mostly among patients aged 65+ years, and less favourably among younger patients.. Similarly **Dan Lundblad et al (2010)** identified that the incidence of both MI and its recurrence declined among men , whereas among women it showed an upward trend.

Deprived socioeconomic status (SES) also put MI survivors at risk of recurrent events. This was studied by a series of researchers **Koren.A, Steinberg.D.M, Drory.Y and Gerber.Y**

(2010) by a follow up review of first MI survivors through 2005 using a Composite Derived Index to assess SES. It was inferred that by incorporating multilevel approaches & reducing geographic health disparities effectiveness of secondary prevention initiatives could be increased.

Many clinical factors are known to predict the prognosis and outcome after an incident MI, but very few predict patients at risk of recurrence. Retrospective study done by **Rurik Lofmark, (2011)** identified ≥3 episodes of angina pain during hospitalization after thrombolysis as a risk for recurrent MI. Similar result was observed by **Marmor.A et al (2010)** in addition to other factors such as NSTEMI and Non-Transmural type of infarction as a precipitating factor for recurrent MI. A nationwide observation study done by **Gilles Montalescot et al (2009),** found that patients with NSTEMI appear to be undertreated after discharge from hospital. With other co-morbid illness, these groups should be given similar secondary prevention therapies to avoid recurrent ischemic events. Some other factors related to recurrence of MI was identified by **Saito.D, Shiraki.T, Oka.T, Kajiyama.A and Takamina.T (2007)** in an observational study among 808 Japanese with incident MI patients. Variables identified were transient atrial fibrillation, previous cerebrovascular accident and dyslipidemia. It was suggested that more intensive treatment and rehabilitation is needed for patients with the above risk factors.

Restoring postinfarction cardiovascular function remains a big challenge in the field of cardiovascular disease management. Reseachers **Planken Lula, Rozential Alu and Ekha Lae (2011)** identified that revascularization procedure like intracardiac shunting and coronary angioplasty was effective to intracoronary thrombolysis alone. The result was supported by **Gregg.W.Stone et al, (2011)** who examined the incidence of recurrent MI after different reperfusion strategies. The findings showed a much lower rate of recurrence after coronary angioplasty when compared to rT-PA management.

Although excess adiposity is known to increase the risk of CAD, its impact in patient with established CAD is less defined. In order to evaluate the association and its mechanism researcher **Rea. TD, Heckbert. S.R and Kaplan. R.C (2009)** and **Smith. N.L, Lemaitre. R.N. and Lin.D, (2010)** conducted a population based inception cohort of survivors with incident MI

after hospital discharge. The findings revealed that as BMI increases, risk of recurrent event also increases particularly among those who were obese. A more accurate predictor for recurrent MI was found to be central obesity since there is an association between central fat distribution and risk of recurrent MI as reported by **Bruce.C and Susan.E (2012)** among a cohort of MI survivors. These findings show that a more detailed investigation into the association of central obesity and management of secondary prevention is warranted.

Carola.B.Giorda etal (2009) reported that metabolic disorders like DM were also found to have an ill effect on patients in developing recurrent cardiac events. This was identified by estimating the risk of recurrent MI in diabetic patients. The findings also insisted the need for aggressive treatment in secondary CAD prevention for such patients. Similar result was identified by **Kenneth.J.Mukamal et al (2013)** in their cohort study which states that among early survivors of Acute Myocardial Infarction (AMI), DM was associated with nearly two fold higher recurrent rate which subsequently increases mortality rate as well. The results also added that this magnitude of risk associated with DM was similar with that of previous MI. **Chuvn et al (2010)** found the association of recurrent MI among insulin and non-insulin treated DM. The result showed that a year after MI, elderly patients with non-insulin- and insulin-treated diabetes mellitus had significantly greater risk for readmission for recurrent myocardial infarction than patients without diabetes mellitus, and risk was found to be high among insulin treated patients.

CAD is the most lethal cardiovascular sequel of HT and post infarction outcome was poor in HT patient. **Agha.W.Haider et al (2009)** examined the risk of antecedent HT on outcome after incident MI. The researcher identified that recurrence rate was higher in Stage II to IV HT subjects. Researchers **Deaconu.A, Ismail.A, Iancivic.S and Dorobantu.M (2013)** explained the characteristic and prognostic importance of HT patients presenting with STEMI. The result showed that HT is associated with increased rate of adverse events after MI and follow up efforts should aim in controlling BP to decrease recurrent coronary events.

All the above studies identified the importance of strengthening the secondary prevention strategies for MI survivors. The crucial role of secondary prevention programmes in preventing recurrent MI was studied by so many researchers like **Harbman.P, (2010)** and **Clark.A.M, Hartling.L, Vandermeer.B and McAlister.F.A, (2009)** for CAD on reduction of recurrent MI

by meta analysis. The researcher also identified a significant reduction in recurrent MI in patient who received secondary intervention programmes. Most of these programmes improved the quality of life or functional status.

A descriptive cross sectional and correlational study was done by **Rafael et al, (2014)** to examine the psychological and somatic factors associated with recurrent MI by assessing patients for level of depression, anxiety, vital exhaustion and sleep disturbances. The researchers identified vital exhaustion and anxiety as a risk factor for recurrent MI.

Stefano DI Bartolomeo, Massimiliano Marino, Paolo Gaustaroba, Franscesa Valent and Rossana De Palma, (2014) in their self controlled case series study identified that adherence to recommended Beta Blocker (BB) therapy reduces the risk of recurrent MI by 20%. Simialarly researchers **Claudio Rapezzi et al, (2015)** found that poor adherence to Angiotensin converting enzyme inhibitors(ACE-I) or angiotensin receptor blockers(ARB) was associated with 20% increase in risk of recurrent MI. These studies showed that adherence to either prescribed BB and ACE-I/ARB was effective against recurrent MI. But **(Van der elset et al 2011)** in their research stated that effect of combination of drugs from different classification proved effective against recurrent MI by 41%.

2.1.2 Scientific reviews related to life style factors

Majority of life style factors have a major impact on a person's health especially leading to deterioration in cardiovascular health. Smoking status was associated with elevated risk for recurrent events which was evident from the research findings of **Rea TD et al, (2012) and Grand A, Fitchter.P and Hinet. J.F, (2010)** The result indicates that among person quitting smoking after incident MI, the risk of recurrent MI declined to a level equal to that of non smokers by about 3 years after cessation. Poor prognosis and nonfatal recurrent MI events was seen in MI survivors with the habit of alcohol consumption. **Imre Janszky, (2008)** in his research study found a significant association that binge drinking increases the risk of recurrent MI by 12%. **Yariy et al, (2010),** conducted population based cohort study to compare the incidence of recurrent MI among smokers, pre MI-quitters, post MI-quitters and persistent smokers using a population based cohort study. The result revealed that smoking cessation either

before or after AMI is associated with improved survival. Among persistent smokers, reducing intensity after AMI appears to be beneficial.

Poor sleep and sleep without a restorative function are associated with poor prognosis after incident MI. Recurrent MI was observed by researcher **Leinweber.c, Kecklund.G, Akerstedt.T and Orth Gomer.K, (2008)** in their research work. In addition to the findings, association between sleep problems and cardiac events was also explained (**Stockholm female Coronary risk study)**

2.1.3 Scientific reviews related to genetic factors

According to **CADI research foundation** (Coronary Artery Disease in Asian Indians) risk of recurrent MI is as high as 12 fold when multiple family members has a history of heart disease & dyslipidemia. The risk is also significantly high if any one of the family members had a history of heart disease.

SECTION 2.2: Scientific reviews related to secondary prevention

2.2.1 Scientific reviews related to secondary prevention

According to **Pantaleo Giannuzzi, et al (2008)** in a multicentre randomized controlled trial found that continued reinforced intervention upto 3 years after rehabilitation following MI is effective in decreasing risk of several CV outcomes particularly recurrent MI. **Krishnaraj. S.Rathod, Shoaib Siddique., Barron Gin, John Hogan and Sandy Gupta (2012)** also found that comphrehensive cardiac rehabilitation programme not only provide them with risk factor management but also strengthen patients adherence to medication. Series of researchers **Cooper et al (2009)** identified that cardiac rehabilitation programme have been consistently shown to reduce mortality & recurrent ACS event.

SUMMARY

The above literature provided scientific evidence in identifying the precipitationg factors for recurrent MI and also stated the importance of secondary prevention

CHAPTER 3

RESEARCH METHODOLOGY

RESEARCH METHODOLOGY

Research Methodology is the way to solve the research problem scientifically and systematically. It helps in understanding the research problem with the logic behind them.

This chapter deals with the methodology adopted for the study. It includes the research approach, design, variables, setting, population, sample, criteria for sample selection, sample size, sample technique, development & description of the tool, content validity, pilot study, reliability of the tool, data collection procedure and plan for data analysis.

3.1 RESEARCH APPROACH

A quantitative research approach has been used for this design was chosen for this study.

3.2 RESEARCH DESIGN

A Non Experimental retrospective case control design was chosen for the study.

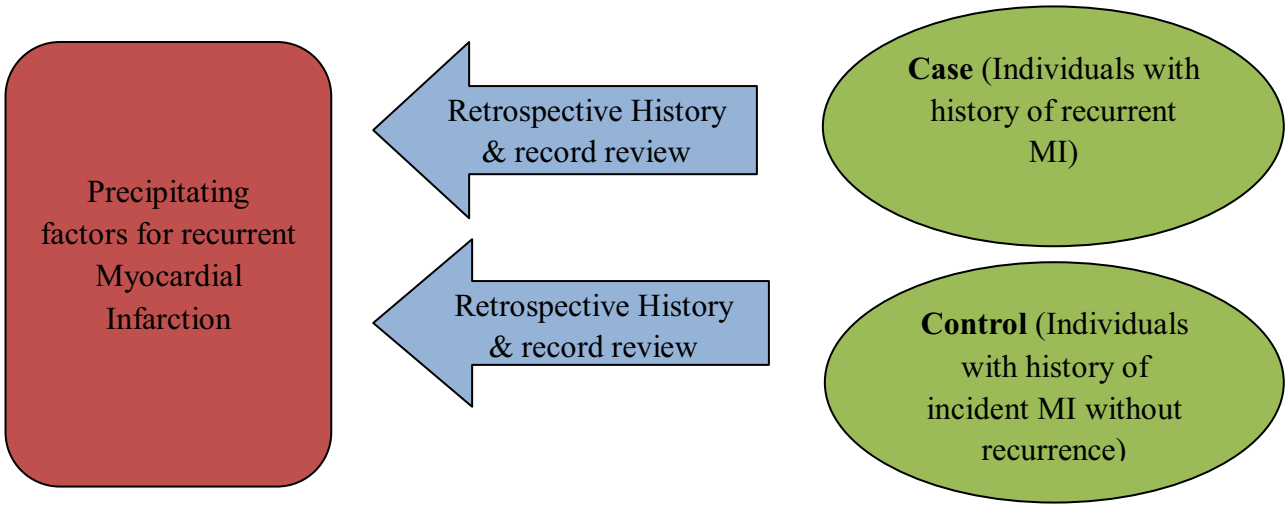


Fig. 3.2.1: Schematic representation of the Case-Control study design

3.3 VARIABLES

3.3.1 Research variable:

Precipitating factors for recurrent Myocardial Infarction such as clinical prognostic factors, genetic factors, lifestyle factors and dietary factors.

3.3.2 Extraneous variables

Age, gender, education, occupation and marital status.

3.4 SETTING OF THE STUDY

The setting for the study was Frontier Life Line Hospital, Mogappair, Chennai. It is a renowned 120 bedded hospital for Cardiovascular disease management. It has 6 cardiac Out Patient Departments (OPD) functioning from 9am to 5pm with an average of 120 patients per day. The OPD waiting area can accommodate 40 patients at a time.

3.5 POPULATION

3.5.1 Target population

The target population consisted of all patients with medical history of recurrent MI as case group and incident MI as control group.

3.5.2 Accessible population

All patients with medical history of recurrent MI as cases and incident MI as controls, attending the OPD's of Frontier Life Line hospital comprised the accessible population.

3.6 SAMPLE

The patients with incident MI and recurrent MI who satisfied the inclusive criteria and were available in the selected settings at the time of data collection, were taken as case & control group samples.

3.7 SAMPLE SIZE

117 patients with 61 in control group(incident MI) and 56 in case group who fulfilled the inclusive criteria.

3.8 CRITERIA FOR SAMPLE SELECTION

3.8.1 Inclusion Criteria

Case: Patient who had

1. medical history of more than one episodes of MI
2. recurrent episodes of MI after 28 days of incident MI (first episode)

Control: Patient who had

1. medical history of incident MI(only one episode) without recurrence
2. only incident MI more than one year or more before the period of data collection

Both: Patient who

1. were aged between 30-70 years
2. were attending Cardiac OPD at FLL Hospital
3. had their medical records available for review
4. were willing to participate in the study
5. could understand Tamil or English

3.8.2 Exclusion criteria

Patients who

1. had severe auditory impairment
2. had severe cognitive impairment
3. did not have previous records & reports

3.9 SAMPLING TECHNIQUE

Non-probability purposive sampling technique was used to select 117 patients as samples from Frontier Life Line Hospital

3.10 DEVELOPMENT & DESCRIPTION OF THE TOOL

After an extensive review of literature, discussion with the experts and the investigators professional experience, the tool was developed to identify the precipitating factors for recurrent MI.

The tool constructed for the study has two sections:

Part A: Personal data sheet

Part B: Structured interview schedule

3.10.1 Part A

Personal data sheet to collect the demographic characteristics consisting of 6 variables which included age, gender, education, occupation, family monthly income and marital status

3.10.2 Part B

Structured interview schedule on precipitating factors such as clinical prognostic factors, genetic factors, lifestyle factors & dietary factors.The structured questionnaire consists of 63 questions formulated under separate sub headings to assess the precipitating factors for recurrent MI in both control and case group by interview method. The collected information's were categorized according to the precipitating factors.

Items	No. of questions
Clinical prognostic Factors	30
Genetic factor	4
Life style factor	19
Dietary factors	10
Total	63

Intervention: All the samples in case (recurrent MI) and control group (Incident MI) were provided with a pamphlet on prevention of recurrent MI after the data collection.

3.11 CONTENT VALIDITY

The content validity of the data collection tool was ascertained with the expert's opinion in the following field of expertise

- Interventional Cardiology – 2
- Medical Surgical Nursing – 4
- Intensive care unit – 1

3.12 ETHICAL CONSIDERATIONS

1) Beneficence

The research study was approved by the Institutional Ethical Review Board (IERB) of International Centre for Collaborative Research (ICCR) of Omayal Achi College of Nursing (OACN) in the meeting held on December 2014. The study was beneficial for the samples as it enhanced their knowledge through pamphlet about precipitating factors of recurrent MI after the results.

a) The right to freedom from harm and discomfort:

No harm or discomfort was caused to any of the patients during the process of data collection.

b) The right to protection from exploitation:

The investigator explained the procedure and nature of the study to the participants and ensured that none of the samples in both control and case group would be exploited or denied fair treatment.

2) Respect for human dignity:

The investigator followed the second ethical principle of respect for human dignity. It includes the right to self-determination and the right to self-disclosure

a) The respect to self-determination:

The investigator provided full freedom to the subjects to decide voluntarily whether to participate in the study or to withdraw from the study and the right to ask questions.

b) The right to full disclosure:

The researcher has fully described the nature of the study, the person's right to refuse participation and the researcher's responsibilities based on which both oral and written informed consent was obtained from the samples.

3) Justice:

The researcher adhered to the third ethical principle of justice; it includes samples right to fair treatment and right to privacy.

a) Right to fair treatment:

The researcher selected the study samples based on the research requirements and both groups received pamphlet on prevention of recurrent MI.

b) Right to privacy:

The researcher maintained the samples privacy throughout the interview. No photos or videos of the patient was taken during data collection procedure. Interview was conducted in the consultant waiting room separately for the samples

4) Confidentiality

The researcher maintained confidentiality of the data disclosed by the study samples. Samples were given numbers and their name or other details of the samples was not disclosed in any part of the study. Dissemination of study results through conference or journals contain only statistical data

3.13 RELIABILITY

Variables	Tool	Method	Value	Inference
Selected factors for recurrent MI	Structured Interview Schedule	Inter-rater	r = 0.90	Highly reliable

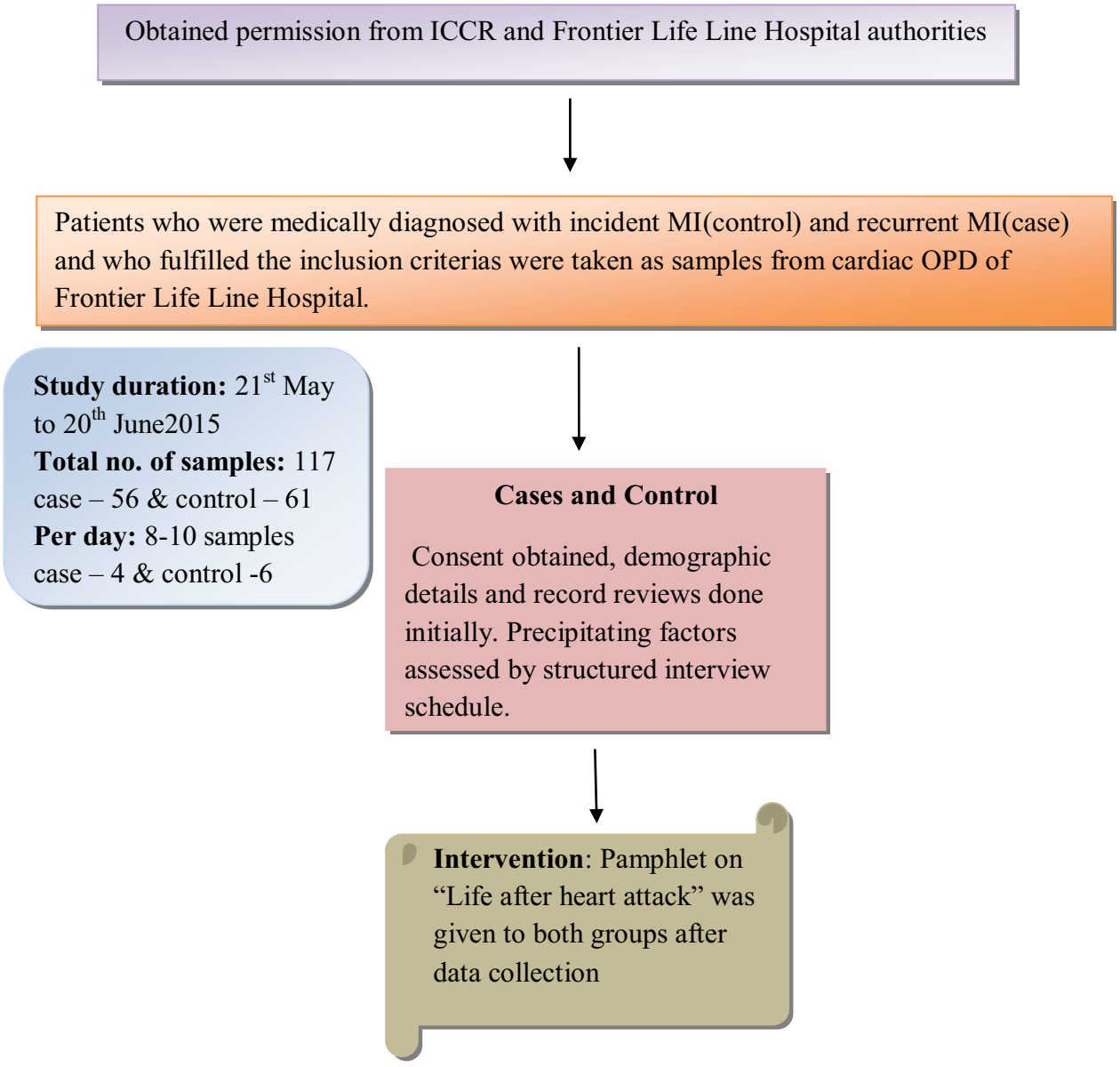
3.14 PILOT STUDY PROCEDURE

Pilot study was conducted at Cherian Heart Foundation, Mogappair from 15.05.2015 to 20.05.2015. A formal written permission was sought from the Principal of Omayal Achi

College of Nursing, Chairman and Head of the Department of Cardiology of Cherian Heart Foundation.A total of 10 samples for control group and case group who fulfilled the inclusive criteria for sample selection were selected using non-probability purposive sampling technique. The investigator introduced self to the patient and established rapport with the client. A brief explanation about the study was given to the patients. After obtaining written consent from participants, data collection was commenced.

The interview was conducted using structured interview method to assess the precipitating factors. With each sample the research investigator spent 20-30 minutes to conduct interview. Confidentiality was strictly maintained during the process of data collection

3.14 PROCEDURE FOR DATA COLLECTION



3.16 PLAN FOR DATA ANALYSIS

The data was analysed using descriptive & inferential statistics.

Descriptive Statistics

1. Frequency and percentage distribution was used to analyze the demographic variables of the samples.

Inferential statistics

1. Chi square test to find the association between the precipitating factors and group (case and control)
2. Binary logistic regression analysis odds ratio to measure the association and identify the risk.

CHAPTER 4

DATA ANALYSIS AND INTEPRETATION

DATA ANALYSIS AND INTERPRETATION

This chapter deals with analysis and interpretation of the data collected from 117 samples regarding identification of precipitating factors for recurrent MI. The data collected was organized, tabulated and analyzed according to the objective. The findings based on the descriptive and inferential statistical analysis are presented under the following.

ORGANIZATION OF THE DATA:

Section 4.1: Description of selected demographic variables of both the case and control group.

Section 4.2: Association of selected clinical prognostic factors, lifestyle, genetic and dietary factors between the case and control group.

Section 4.3: Identification of precipitating factors for recurrent MI among the group

SECTION 4.1: DESCRIPTION OF SELECTED DEMOGRAPHIC VARIABLES OF THE CASE AND CONTROL GROUP.

Table 4.1.1: Frequency and percentage distribution of selected demographic variables like age, gender, educational status, occupation, marital status and monthly income.

N = 117

Sl.No.	Demographic variables	Case (N=56)		Control (N=61)	
		No.	%	No.	%
1	**Age in years**				
	40 – 50	19	34	17	27.9
	51 – 60	26	46.4	32	52.4
	61 – 70	11	19.6	12	19.7
2	**Gender**				
	Male	31	55.4	31	50.8
	Female	25	44.6	30	49.2
3	**Education**				
	Nonliterate	-		-	
	Primary	-		-	
	Higher secondary	30	53.6	33	54
	Degree	22	39.3	25	41
	Others	4	7.1	3	5
4	**Occupation**				
	Skilled	5	9	9	14.7
	Technical	19	34	20	32.7
	Professional	4	7	3	5
	Homemakers	17	30.4	17	27.9
	Others	11	19.6	12	19.7
5	**Family monthly income in Rs.**				
	<5000	-	-	-	-
	6000 – 10,000	12	21.4	11	18

Sl.No.	Demographic variables	Case (N=56)		Control (N=61)	
		No.	%	No.	%
	11, 000 – 15, 000	18	32.2	22	36
	>16, 000	26	46.4	28	46
6	**Marital status**				
	Single	-	-	-	-
	Married	54	96.4	60	98.4
	Widow/ widower	2	3.6	1	1.6
	Separate	-	-	-	-
	Divorce	-	-	-	-
	Others	-	-	-	-

The table 4.1.1 describes that most of the samples in case and control group belongs to age group of 51-60yrs who are males with higher secondary education. Most of the samples were technical workers, with a family income of >16,000 Rs and were married

SECTION 4.2: ASSOCIATION OF SELECTED CLINICAL PROGNOSTIC FACTORS, GENETIC, LIFESTYLE & BIOPHYSIOLOGICAL FACTORS OF CASE AND CONROL GROUP TO IDENTIFY RISK FACTORS FOR RECURRENT MYOCARDIAL INFARCTION BETWEEN THE GROUPS.

Table 4.2.1(a): Association & odds ratio of selected clinical prognostic factors like DM, its chronicity and duration of treatment between case and control groups.

N= 117

SL. No.	Clinical Prognostic Factor	Cases N= 56	Control N=61	Chi-Square Value	Odds Ratio	95% C.I (upper limit – lower limit)
1	**History of Diabetes Mellitus**			χ^2=0.822 d.f = 1 p = 0.364 N.S		
	Yes	38	46		0.688	0.30-1.54
	No(reference)	18	15		-	-
2	**If yes chronicity of DM**				-	-
	<12 months	-	-		-	-
	1-5 yrs(reference)	5	0	**χ^2=9.409 d.f = 3 p = 0.024 S***	-	-
	6-10 yrs	13	26		**1.25***	0.27-5.6
	>10yrs	20	20		0.93	0.22- 3.8
	NA	18	15		-	-
3	**Treatment for DM**				-	-
	<12 months	-	-		-	-
	1-5 yrs(reference)	5	0	**χ^2=9.4096 d.f = 3 p = 0.024 S***	-	-
	6-10 yrs	13	26		**1.25***	0.27-5.6
	>10yrs	20	20		0.93	0.22- 3.8
	NA	18	15		-	-

S^* - Significant S^* - Highly Significant S^{***} - Very high significant * - Precipitating factor

The analysis in the table no. 4.2.1(a) shows no significant association for DM but shows a significant association between the chronicity and treatment duration of diabetes mellitus and recurrent MI at $p<0.05$.

The corresponding odds ratio for both these variables is 1.25,which indicates that samples with 6-10yrs of chronicity and treatment duration of DM are at risk of developing recurrent MI when compared to samples with lesser chronicity and treatment duration.

Table 4.2.1(b): Association & odds ratio of selected clinical prognostic factors like HT, its chronicity and duration of treatment between case and control groups.

N= 117

Sl No.	Clinical Prognostic Factor	Cases N= 56	Control N=61	Chi-Square Value	Odds Ratio	95% C.I (upper limit – lower limit)
1	**Hypertension**			χ^2=0.343 d.f = 1 p = 0.558 N.S	-	-
	Yes	36	36		**1.25***	0.59- 2.65
	No(reference)	20	25		-	-
2	**If yes chronicity of HT**			**χ^2=8 d.f = 2 p = 0.046 S***	-	**-**
	<12 months	**-**	**-**		**-**	**-**
	1-5 yrs	-	-		**-**	**-**
	6-10 yrs(reference)	12	24		**-**	**-**
	>10yrs	24	12		**1.57***	0.62- 4
	NA	20	25		**-**	**-**
3	**Treatment for HT**			χ^2=7.3076 d.f = 3 p = 0.062 N.S	-	-
	<12 months	-	-		-	-
	1-5 yrs(reference)	5	2		-	-
	6-10 yrs	11	22		**1.08***	0.25 – 4.6
	>10yrs	20	12		**2.37***	0.55-10.19
	NA	20	25		-	-

S* - Significant S* - Highly Significant S*** - Very high significant *-Precipitating factor

The analysis in the table 4.2.1 (b) shows no significant association between hypertension and recurrent MI at $p<0.05$. The corresponding odds ratio of 1.250 which implies hypertension is a precipitating factor for recurrent MI.With regard to chronicity of HT, there is a significant association between the groups and the odds ratio.1.57 indicates that samples with longer

duration of HT are at risk of developing recurrent MI in comparison to samples with shorter duration.

With regard to treatment duration, there is no significant association between the groups, 2.37 odds ratio states that longer treatment duration for HT increases the risk two times for developing recurrent MI.

Table 4.2.1(c): Association & odds ratio of selected clinical prognostic factors like episodes of anginal pain during hospitalization after thrombolysis and drug compliance between case and control groups N = 117

Sl No.	Clinical Prognostic Factor	Cases N=56	Control N=61	Chi-Square Value	Odds Ratio	95% C.I (upper limit – lower limit)
1	**Episodes of angina pain after thrombolysis**					
	No(reference)	15	32	χ^2=14.28 d.f = 3 p = .062 N.S	-	-
	1	17	13		**2.79***	1.08 – 7.19
	2	12	3		**3.85***	2.09 – 34.81
	3	2	0		-	-
	NA	10	13		-	
2	**Adherence to drug therapy**					
	Regular	56	61		-	-
	Irregular	-	-			
	discontinued	-	-			
3	**If irregular or discontinued**					
	Reason	-	-		-	-
	Expensive	-	-			
	Alternative treatment	-	-			
	Side effect	-	-			
	Others	-	-			
	NA	56	61			

S* -Significant S*- Highly Significant S***- Very high significant *- Precipitating factor

With regard to episodes of anginal pain, table 4.2.1(c) shows a significant association between number of episodes and recurrent MI at the level of $p<0.05$, and the odds ratio for a single episode is 2.790 and for two episode is 3.853. This implies that risk for developing recurrent MI increases two fold in sample with one episode and three fold in samples with two episodes of anginal pain in comparison to samples with no episode.

Table 4.2.1(d): Association & odds ratio of selected clinical prognostic factors like rehabilitation programme, health checkups and its duration between case and control groups.

N=117

Sl No.	Clinical Prognostic Factor	Cases N=56	Control N=61	Chi-Square Value	Odds Ratio	95% C.I (upper limit – lower limit)
1	**Rehabilitation programme**			**χ^2=4.4389 d.f = 1 p = 0.035 S***	-	-
	Yes	16	29		-	-
	No(reference)	40	32		**2.26***	1.05 -4.9
2	**Health check ups**			χ^2=1.099 d.f = 1 p = 0.295 N.S	-	-
	Regular	55	61			
	Irregular	1	0			
	Others	-	-			
3	**Duration of health check ups**			**χ^2=31.763 d.f = 3 p = 0.000 S*****	-	-
	Monthly once(reference)	36	15		-	-
	Every 3 months	15	11		0.56	0.21-1.5
	Every 6 months	3	16		0.78	0.20 – 0.30
	Yearly once	2	19		0.04	0.01-0.21

S* - Significant S* - Highly Significant S*** - Very high significant * - Precipitating factor

The analysis in the table 4.2.1 (d) shows a significant association between participation in rehabilitation programme and recurrent MI at $p<0.05$ with corresponding odd's ratio 2.266. The result implies samples who have not participated in rehabilitation programme is twice at risk of developing recurrent MI in comparison to samples who have attended rehabilitation programme.

The analysis in the table 4.2.1 (d) shows a significant association between duration of health checkups and recurrent MI at $p<0.05$. The odds ratio indicates that frequent reviews for MI is a protective factor against recurrent MI.

Table 4.2.1 (e): Association & odds ratio of selected Clinical prognostic factor (bio-physiological measures) like BMI, central obesity and blood pressure between case and control group.

N =117

Sl No.	Bio –physiological factors	Case N=56	Control N=61	Chi square value	Odds ratio	95% C.I (Upper limit-lower limit)
1	**BMI**			χ^2=0.965 d.f = 2 p = 0.617 N.S		
	≤18.5	-	-		-	-
	18.5-24.9(reference)	26	31		-	-
	25-29.9	20	23		**1.03***	0.46 – 2.29
	≥30	10	7		**1.70***	0.56 – 5.10
2	**Central Obesity**					
	Male			χ^2= .2605 P=O.6097 NS	**-**	-
	.95 or below	--	--		**-**	-
	.96 to 1(reference)	15	13		**-**	-
	1+	16	18		**1.29***	0.89 – 4.23
	Female			χ^2= 2.055 P=0.1516 NS	**-**	-
	.80 or below	--	--		**-**	-
	.81 to .85(reference)	11	19		**-**	-
	.85+	14	11		**1.45***	0.23 – 3.45
3	**Blood pressure**			**χ^2=8.126 d.f = 2 p = 0.017 S****	**-**	-
	SBP 100-140 DBP 60-90(ref)	12	28		**-**	-
	SBP 140-159 DBP 90-99	27	18		**3.50***	1.42 – 8.62
	SBP≥160mmhg DBP≥100	17	15		**2.64***	1 – 6.97

S* - Significant S* - Highly Significant S*** - Very high significant * - Precipitating factor

The table shows no significant association between BMI and recurrent MI among the groups. The corresponding odds ratio indicates that samples with BMI 25-29.9 are 1.037 times risk of developing recurrent MI and with BMI ≥30 are 1.703 times risk of developing recurrent MI.

With regard to central obesity there is no significant association between the groups. The odds ratio for males, 1.298 implies that samples with >1 index for central obesity is at risk of developing recurrent MI in comparison to samples with <1 and it is a precipitating factor.The same table shows no significant association between case and control group with regard to central obesity for females, the odds ratio 1.454 indicates that samples with index > 0.85 are at risk of developing recurrent MI.

The analysis table shows a significant association between case and control group with regard to blood pressure. The corresponding odds ratio 3.50 indicates samples with BP140-159/90-99 is three times at risk of developing recurrent MI when compared to normotensive individuals. The corresponding odds ratio 2.64 indicates samples with BP≥160/100 is two times greater risk of developing recurrent MI when compared to normotensive individuals.

Table 4.2.1(f): Association & odds ratio of selected Clinical prognostic factors (record reviews) like revascularization procedure, type and location of infarction between case and control groups.

N = 117

Sl No.	Record reviews	Case N=56	Control N=61	Chi square	Odds ratio	95% C.I (lower limit – upper limit)
1	**Revascularization procedure**			χ^2=4.472 d.f = 1 p = 0.034 S**	-	-
	Yes	45	57		**3.91***	1.62 – 9.44
	No(reference)	11	4		-	-
2	**If yes, type of revascularization procedure**			χ^2=15.080 d.f = 3 p = 0.001 S***	-	-
	CABG	23	23		1	0.43 – 2.28
	PTCA(reference)	22	22		-	-
	Both	0	12		-	-
	NA	11	4		-	-
3	**Type of infarction**			χ^2=6.583 d.f = 1 p = 0.010 S**	-	-
	NSTEMI	38	27		**2.658***	1.25 – 5.65
	STEMI(reference)	18	34		-	-
4	**Location of infarction**			χ^2=5.7237 d.f = 1 p = 0.016 S**	-	-
	Non-transmural	18	33		**2.488***	0.90 – 4.06
	Transmural(reference)	38	28		-	-

S*-Significant S*-Highly Significant S***-Very high significant * - Precipitating factor

The table shows a significant association with regard to revascularization procedure between the groups and the odds ratio 0.287 shows that samples who had underwent revascularization procedure are less likely to develop recurrent MI. The table also shows a significant association for type of revascularization procedure between case and control group.

With regard to type of infarction, table shows a significant association between case and control group. The corresponding odds ratio for both the variables are 2.658 and 2.488 respectively, which indicates samples with NSTEMI and non-transmural type of infarction are

twice the risk of developing recurrent MI in comparison to STEMI and transmural type of infarction.

Table 4.2.1(g): Association & odds ratio of selected clinical prognostic factors (record reviews) like management of DM, HT and MI between case and control group.

N=117

Sl No.	Record reviews	Case N=56	Control N=61	Chi square value	Odds ratio	95 % C.I (lower limit – upper limit)
1	**Management of DM**				-	-
	OHA(reference)	19	19		-	-
	Insulin	11	12	χ^2=5.27 d.f = 2 p = 0.260 N.S	0.91	0.9 – 0.325
	Both	8	17		0.47	0.47 – 0.16
	Alternative medicine	0	1		-	-
	NA	18	12		-	-
2	**Management of MI**				-	-
	Ca Channel blockers/antiplatelets	13	18	**χ^2=19.353 d.f = 2 p = 0.000 S*** **	1.44	0.12- 17.6
	B blockers/antiplatelets	19	21		1.81	0.15 – 21.5
	All three	23	20		**2.30***	0.19 – 27.3
	Others	1	2		-	-
3	**Management of HT**				-	-
	Ca channel blockers	7	8		0.61	0.15 – 2.48
	Angiotensin II receptor blockers	3	4	χ^2=1.631 d.f =5 p = 0.803 N.S	0.52	0.08 – 3.5
	ACE inhibitors	5	8		0.43	0.1 – 1.2
	B blockers	11	9		0.85	0.23 – 3.1
	More than one (reference)	10	7		-	-
	NA	20	25		-	-

S^*- Significant S^*- Highly Significant S^{***} - Very high significant *- Precipitating factor

The analysis table shows no significant association between case and control group. Samples taking both oral hypoglycemic agent and insulin are reduced risk of developing recurrent MI in comparison to samples taking only insulin as indicated by the odds ratio 0.471.

With regard to management of HT, there is no significant association between case and control group. Among the drugs, odds ratio for ACE inhibitors is less (ie) 0.43 which indicates that samples taking ACE inhibitors for HT are at lesser risk for developing recurrent MI.

With regard to management of MI, there is no significant association between case and control group. The odds ratio was high for samples who are taking all three classes of drugs(Ca-Channel blockers, B-blockers and antiplatelets) of 2.30 when comparing to samples who are taking calcium channel blockers & antiplatelets(1.44) and for B-blockers & antiplatelets(1.81).

Table 4.2.1(h) : Association & odds ratio of selected clinical prognostic factors (record reviews) like past history of cerebrovascular accident, heart disease and autoimmune disorders between case and control group.

N=117

Sl No.	Record reviews	Case N=56	Control N=61	Chi square	Odds ratio	95% C.I (lower limit – upper limit)
1	**Past history of**			χ^2=4.610 d.f = 3 p = 0.203 N.S	-	-
	Nil	48	56		-	-
	CVA	2	2		**1.167***	0.15 – 8.5
	Autoimmune	4	0		-	-
	heart disease	2	3		0.78	0.12 – 4.8
2	**Autoimmune disorders**			χ^2=4.511 d.f = 2 p = 0.104 N.S	-	-
	RA	3	0			
	SLE	1	0			
	SS	-	-			
	NA	52	61			
3	**Heart disease**			χ^2=2.216 d.f = 1 p = 0.330 N.S	-	-
	Nil	54	61			
	RHD	1	0			
	Valvular disorders	1				
	Others	-	-			

S* - Significant S* - Highly Significant S*** - Very high significant * - Precipitating factor

The table shows no significant association between case and control group. Samples with previous history of CVA are 1.167 times greater risk of developing recurrent MI in comparison to autoimmune disorders and heart disease.

Table 4.2.1(i): Association & odds ratio of selected clinical prognostic factors (record reviews) co-morbid illness between case and control group.

N= 117

Sl No.	Record reviews	Case N=56	Control N=61	Chi square	Odds ratio	95% C.I (lower limit – upper limit)
1	**Co-morbidity**					
	Nil	31	36	χ^2=1.020 d.f = 3 p = 0.796 N.S		
	Resp. disease	12	10		**1.39***	0.53 – 3.66
	Renal prob	7	6		**1.35***	0.41 – 4.46
	Vascular disorders	6	9		0.77	0.24 – 2.41
2	**Resp. disease**					
	NA	44	51	χ^2=5.204 d.f = 3 p = 0.157 N.S	-	-
	Asthma	5	8			
	COPD	3	2			
	Sleep apnea	-	-			
	Others	4	0			
3	**Renal problems**					
	Nil	49	55	χ^2=4.092 d.f = 2 p = 0.129 N.S	-	-
	Calculi	2	5			
	Infections	5	1			
	Others	-	-			
4	**Vascular disease**					
	Nil	50	52	χ^2=0.426 d.f = 1 p = 0.514 N.S	-	-
	DVT	-	-			
	Varicose veins	6	9			
	Bleeding disorders	-	-			
	Others					

S^* - Significant S^*- Highly Significant S^{***} - Very high significant * - Precipitating factor

The table shows no significant association between case and control group with regard to co-morbid illness. Samples with co-morbid illness like respiratory (1.394) and renal disease(1.355) are at risk of developing recurrent MI when compared to vascular disorders.

4.2.2: Association & odds ratio of selected genetic factors like family history of heart disease and hypertension between case and control groups.

N=117

Sl No.	Genetic factors	Case N=56	Control N=61	Chi square value	Odds ratio	95% C.I (upper limit – lower limit)
1	**Family history of heart disease**				-	-
	Paternal	10	8	χ^2= 2.346 d.f = 3 p=.504 N.S	**1.250**	0.44 – 3.5
	Maternal	3	6		0.78	0.11 – 2.14
	Both	-	-		-	-
	Sibling	4	8		0.500	0.13 – 0.17
	More than one	-	-		-	-
	Nil(reference)	39	39		-	-
2	**Family history of Hypertension**			χ^2=9.717 d.f = 5 p = 0.084 N.S	-	-
	Paternal	13	24		0.42	0.16-1.11
	Maternal	8	14		0.45	0.15 – 1.35
	Both	11	5		**1.73***	0.49 – 6.09
	Sibling	5	2		**1.97***	0.33 – 1.63
	More than one	0	1		-	-
	Nil(Reference)	19	15		-	-
3	**Family history of Diabetes Mellitus**			χ^2=8.518 d.f = 5 p = 0.130 N.S	-	-
	-Paternal	21	19		0.71	0.26 – 1.90
	Maternal	6	14		0.27	0.08 – 0.94
	Both	8	15		0.34	0.11 – 1.08
	Sibling	2	0		-	-
	More than one	2	2		0.64	0.07 – 5.29
	Nil(reference)	17	11		-	-
4	**Family history of Dyslipidemia**			**χ^2=11.304 d.f = 5 p = 0.010 S****	-	-
	Paternal	7	2		**4.95***	0.97 – 25
	Maternal	4	1		**5.65***	0.61 – 52.4
	Both	-	-		-	-
	Sibling	4	0		-	-

	More than one	-	-		-	-
	Nil	41	58		-	-

S^{*} - Significant S^{*} - Highly Significant S^{***} -Very high significant * - Precipitating factor

The analysis in the table 4.2.2 shows no significant association between the groups with regard to family history of heart disease and recurrent MI. The odds ratio of 1.250 for paternal history of heart disease, maternal history is 0.78 and sibling history is 0.500, indicating sample with history of paternal heart disease carries highest risk in comparison to sample with other familial history of heart disease.

The analysis in the table 4.2.2(a) shows no significant association between family history of hypertension and recurrent MI among the groups. The odds ratio for sample with both paternal and maternal history of hypertension is 1.737 and for sibling history is 1.974 which indicates sample with both paternal and maternal history and sibling history of hypertension are at risk of developing recurrent MI in comparison to sample with other familial history of hypertension.

The analysis in the table 4.2.2(a) shows no significant association between family history of DM and recurrent MI among the groups. The odds ratio, 0.277 for maternal history of DM indicates samples with maternal history of DM are less likely to develop recurrent MI when compared to samples with paternal, both(paternal and maternal) or multiple family history of DM.

With regard to family history of dyslipidemia, the table 4.2.2(a) shows a significant association between the groups at $p<0.05$. Both paternal and maternal family history of dyslipidemia were identified as precipitating factors with maternal history showing greater risk for recurrent MI than the former.

4.2.3(a): Association & odds ratio of selected life style factors like working hours, night shift and its duration per week between case and control groups.

N= 117

Sl No.	Life style factors	Case N=56	Control N=61	Chi square value	Odds ratio	95% C.I (upper limit – lower limit)
1	**Working hours/day**			χ^2=6.965 d.f = 3 p = 0.073 N.S	-	-
	≤5hrs	-	-		-	-
	5-10 hrs(reference)	27	33		-	-
	10-15hrs	17	8		**2.59***	0.97 – 6.93
	≥15hrs	4	11		0.44	0.12 - 1.55
	NA	8	9		-	-
2	**Night shift**			χ^2=0.039 d.f = 1 p = 0.844 N.S	-	-
	Yes	9	9		**1.10***	0.40 – 3.02
	No(reference)	47	52		-	-
3	**Weeks/month**			χ^2=0.039 d.f = 1 p = 0.844 N.S	-	-
	<2wk	9	9			
	>2wk	-	-			
	NA	47	52			

S*-Significant S*- Highly Significant S*** -Very high significant * - Precipitating factor

The table 4.2.3(a) shows no significant association between working hours per day and recurrent MI. The odds ratio 2.59 indicates that samples who work for about 10-15 hrs are at twice the risk of developing recurrent MI with reference to sample working for less than 10 hours and hence it is a precipitating factor.

The table 4.2.3(a) shows no significant association between night shift and recurrent MI among the groups. The odds ratio of 1.106 shows that samples working at night are at risk of developing recurrent MI when compared to samples those who work only during the day. Hence night shift is a precipitating factor.

Table 4.2.3 (b): Association & odds ratio of selected life style factors like leisure time, sleep pattern and its duration between case and control groups.

N = 117

Sl No.	Life style factors	Case N=56	Control N=61	Chi square value	Odds ratio	95% C.I (upper limit – lower limit)
1	**Leisure time**					
	Nil	0	19			
	<5hrs	56	35	χ^2=30.689 d.f = 2 p = 0.000 S***		
	<10hrs	0	7		-	-
	<15hrs	-	-			
	>15hrs	-	-			
2	**Sleep pattern**				-	-
	Uninterrupted sleep(reference)	27	44	χ^2=7.000 d.f = 1 p = 0.008 S**	-	-
	Interrupted sleep	29	17		**2.78***	1.29 – 5.98
3	**Duration of sleep**					
	≤6hrs	18	4	χ^2=20.721 d.f = 2 p = 0.000 S***	**4.20***	1.3 – 13.9
	6-10hrs(reference)	30	28		-	-
	>10hrs	8	29		0.65	0.26 – 0.10

S*-Significant S*- Highly Significant S*** -Very high significant * - Precipitating factor

With regard to sleep pattern and duration, the table 4.2.3(b) shows significant association between groups against recurrent MI. The odds ratio of 2.780 for interrupted sleep pattern and for duration of sleep is 4.20 (≤6hrs). These values indicates that samples with disturbed sleep pattern have twice the risk of developing recurrent MI and those with ≤6hrs duration of sleep are 4 times greater risk of recurrent MI.

Table 4.2.3(c): Association & odds ratio of selected life style factors like smoking and current status of smoking between case and control groups.

N = 117

Sl No.	Life style factors	Case N=56	Control N=61	Chi square value	Odds ratio	95% C.I (upper limit – lower limit)
1	**Smoker**			χ^2=0.343 d.f = 1 p = 0.558 N.S	-	-
	Yes	36	36		**1.250***	0.59 – 2.64
	No(reference)	20	25		-	-
2	**Current status of smoking**				-	-
	Active	2	2	χ^2=1.075 d.f = 3 p = 0.783 N.S	**3.93***	0.12 – 7.08
	Former	2	4		0.46	0.80 – 2.74
	Quitter(Reference)	32	30		-	-
	NA	20	25		-	-
3	**Cigarettes/day**			χ^2=4.015 d.f = 2 p = 0.134 N.S	-	-
	<2	0	2			
	3 to 5	2	0			
	>6	-	-			
	NA	54	59			

S*-Significant S*- Highly Significant S*** -Very high significant * - Precipitating factor

The table 4.2.3(c) shows no significant association between smoking and recurrent MI between the groups. The odds ratio which shows that smokers are at 1.250 time greater risk of developing recurrent MI when compared to non-smokers and hence it is a precipitating factor.

The tables also shows no significant association between smoking status and recurrent MI among the groups. The odds ratio for active smokers is 3.938 which indicates samples who are active smokers are three times greater risk for developing recurrent MI in comparison to former smokers and quitters.

Table 4.2.3(d): Association & odds ratio of selected life style factors like duration of smoking and cessation between case and control groups.

N = 117

Sl No.	Life style factors	Case N=56	Control N=61	Chi square value	Odds ratio	95% C.I (upper limit – lower limit)
1	**Duration of smoking**				-	-
	<3 yrs	-	-		-	-
	4-6 yrs(reference)	10	21	χ^2=14.119 d.f = 3 p = 0.003 S***	-	-
	7-9 yrs	14	15		-	-
	>10 yrs	12	0		**1.633***	0.59 – 4.51
	NA	20	25		-	-
2	**Duration of cessation**					
	0 to <6 months	-	-		-	-
	6 to <18 months	9	7		-	-
	18 to <36 months	14	7	χ^2=10.262 d.f = 4 p = 0.036 S*	**5.8***	6.84 – 446.1
	36 to <48 months	10	10		**5.6***	1.067 – 30.08
	48 to 60 months (reference)	1	10		-	-
	NA	22	27		-	-

S*-Significant S*- Highly Significant S*** -Very high significant * - Precipitating factor

The table 4.2.3(d) shows a significant association between duration of smoking and recurrent MI at 0.01. The odds ratio, 1.633 implies that samples who are smoking for more than ten years are at risk of developing recurrent MI in comparison to samples who are smokers for <10 years and it is a precipitating factor.

The table shows that there is no significant association between duration of cessation of smoking and recurrent MI. The odd's ratio indicates that the risk of recurrent MI increases to 5.8 times in samples with duration of cessation for <36 months and for samples with duration of cessation between 36 to 48 months risk is 5.6 times.

Table 4.2.3(e): Association & odds ratio of selected life style factors like alcohol, types and amount of consumption between case and control groups.

N = 117

Sl No.	Life style factors	Case N=56	Control N=61	Chi square value	Odds ratio	95% C.I (upper limit – lower limit)
1	**Are u a Alcoholic?**			χ^2=0.046 d.f = 1 p = 0.831 N.S		
	Yes	4	5		**1.09***	0.30 – 4.01
	No(reference)	52	56			
2	**Type of drinker**			χ^2=0.046 d.f = 1 p = 0.831 N.S	-	-
	Regular	-	-			
	Weekly	-	-			
	Social occasions	4	5			
	NA	52	56			
3	**Type of alcohol**			χ^2=5.745 d.f = 2 p = 0.057 N.S	-	-
	Wine	-	-			
	Liquor	4	1			
	Beer	0	4			
	Others	-	-			
	NA	52	56			
4	**Alcohol/day**			χ^2=3.226 d.f = 2 p = 0.199 N.S	-	-
	1	2	5			
	2	2	0			
	≥3	-	-			
	NA	52	56			
5	**Amount of alcohol**			χ^2=0.046 d.f = 1 p = 0.831 N.S	-	-
	NA	52	56			
	≤180 ml	-	-			
	180-260 ml	4	5			
	≥260 ml	-	-			

S* -Significant S* - Highly Significant S*** -Very high significant * - Precipitating factor

The table 4.2.3(e) with regard to consumption of alcohol shows no significant association between case and control group. The corresponding odds ratio indicates that alcoholics are 1.098 time greater risk of developing recurrent MI.

Table 4.2.3(f): Association & odds ratio of selected life style factors like exercise, duration and types between case and control groups.

N=117

Sl No.	Life style factors	Case N=56	Control N=61	Chi square value	Odds ratio	95% C.I (upper limit – lower limit)
1	**Exercise habit**			χ^2=1.937 d.f = 1 p = 0.163 NS	-	-
	Yes	24	34		0.59	0.26 – 1.62
	No(reference)	32	27		-	-
2	**If yes, duration/wk**			**χ^2=11.621 d.f = 2 p = 0.002 S****	-	-
	<7hrs	-	-		-	-
	8-14hrs(reference)	3	18		-	-
	>15hrs	21	16		0.160	0.94 – 2.71
	NA	32	27		-	-
3	**Type of exercise**			**χ^2=8.53 d.f = 3 p = 0.014 S***	--	-
	Walking	24	24			
	Jogging	-	-			
	Aerobics	0	5			
	Yoga	0	5			
	NA	32	27			

S*-Significant S*- Highly Significant S*** -Very high significant * - Precipitating factor

The table 4.2.3(f) shows no significant association between habit of doing exercise and recurrent MI. The corresponding odds ratio,0.595 shows it as a protective factor against recurrent MI.

There is a significant association between case and control group with regard to duration of exercise, The odds ratio, 0.160 indicates that exercise duration for more than 15 hrs per week is a protective factor against recurrent MI.

Table 4.2.4(a): Association & odds ratio of selected dietary factors like type of diet, frequency of non-veg foods and type between case and control groups

N=117

Sl No.	Dietary factors	Case N=56	Control N=61	Chi Square value	Odd's ratio	95% C.I (upper limit – lower limit)
1	**Dietary pattern**			χ^2=1.976	-	-
	Vegetarian(reference)	16	25	d.f = 1	**1.73***	0.80 – 3.75
	Non-vegetarian	42	36	p = 0.160	-	-
	Ova vegetarian	-	-	N.S	-	-
2	**Freq of non vegetarian foods**				-	-
	Once/wk(reference)	27	29	χ^2=3.640	-	-
	Twice/wk	13	7	d.f = 2	0.50	0.69 – 5.47
	Thrice/wk	-	-	p = 0.160	-	-
	>4times	-	-	N.S	-	-
	NA	16	25		-	-
3	**Type of non-veg foods**				-	-
	Chicken	12	10	**χ^2=26.003**	**1.87***	0.65 – 5.34
	Mutton	7	7	**d.f = 4**	**1.56***	0.46 – 5.29
	Fish	13	15	**p = 0.000**	**1.35***	0.51 – 3.58
	Pork	-	--	**S*** **	-	-
	Beef	-	-		-	-
	More than one					
	NA(reference)	16	25		-	-

S*-Significant S*- Highly Significant S*** -Very high significant * - Precipitating factor

The table 4.2.4(a) shows no significant association with regard to type of diet between case and control group. The odds ratio is 1.736 which implies that non-vegetarian diets increase the risk of developing recurrent MI and it is a precipitating factor.

The table 4.2.4(a) does not show any significant association between frequency of non-vegetarian food as and recurrent MI. The corresponding odds ratio 0.501 indicates samples consuming non-vegetarian diet once a week are less likely to develop recurrent MI in comparison to other frequency of consumption.

With regard to type of non vegetarian diets, there is significant association between the groups. The corresponding odds ratio for chicken is 1.8, mutton is 1.56 and for fish is 1.35. out of which intake of chicken carries the highest risk for developing recurrent MI.

Table 4.2.4(b): Association & odds ratio of selected dietary factors like intake of green leafy vegetables and fruits between case and control groups

. **N = 117**

Sl No.	Dietary factors	Case N=56	Control N=61	Chi Square value	Odd's ratio	95% C.I (upper limit – lower limit)
1	**Green leafy vegetables**			**χ^2=16.322 d.f = 1 p = 0.000 S*** **		
	Daily(reference)	54	41		-	-
	More than three times/wk	2	20		0.075	0.01 – 0.34
	Thrice/wk	-	-		-	-
	Twice/wk	-	-		-	-
	Once/wk	-	-		-	-
2	**Fruits**			χ^2=2.877 d.f = 1 p = 0.090 N.S	-	-
	Daily(reference)	31	43		-	-
	More than three times/wk	25	18		**1.926***	0.89 – 4.12
	Thrice/wk	-	-		-	-
	Twice/wk	-	-		-	-
	Once/wk	-	-		-	-
3	**Cooking style**			**χ^2=5.690 d.f = 1 p = 0.017 S***	-	-
	Boiling	51	61			
	Frying	5	0			
4	**Fried foods**			χ^2=4.511 d.f = 2 p = 0.105 N.S	-	-
	More than three times/wk	52	61			
	Thrice/wk	3	0			
	Twice a wk	1	0			
	Once a wk	-	-			

S*-Significant S*- Highly Significant S*** -Very high significant * - Precipitating factor

The table 4.2.4(b) shows a significant association between case and control group with regard to intake of green leafy vegetables. The odds ratio 0.075 indicates samples consuming green leafy vegetables daily are less likely to develop recurrent MI when compared to samples taking greens for more than three times a week and it is a protective factor.

The table 4.2.4(b) does not show significant association between case and control group with regard to intake of fruits. The odds ratio indicates samples who are not consuming fruits on a daily basis are 1.926 times risk of developing recurrent MI.

Table 4.2.4(c): Association & odds ratio of selected dietary factors like intake of salt, sugar and preserved foods between case and control groups.

N = 117

Sl No.	Dietary factors	Case N=56	Control N=61	Chi Square value	Odd's ratio	95%C.I (upper limit – lower limit)
1	**Salt/day**			χ^2=11.91 d.f = 2 p = 0.003 S^{**}	-	-
	<1	46	61			
	2	7	0			
	3	3	0			
	>4	-	-			
2	**Sugar/day**			χ^2=13.226 d.f = 2 p = 0.000 S^{***}	-	-
	<1	45	61			
	2	11	0			
	3	-	-			
	>4	-	-			
3	**Preserved food intake**			χ^2=1.972 d.f = 2 p = 0.373 N.S	-	-
	Daily	-	-		-	-
	>Thrice a week	-	-		-	-
	Twice a wk	1	0		-	-
	Once a wk	5	9		0.57	0.18 – 1.84
	Rare(reference)	50	52		-	-

S^{*}-Significant S^{*}- Highly Significant S^{***} -Very high significant * - Precipitating factor

With regard to preserved foods, the table 4.2.4(c) shows no significant association between case and control group. The odds ratio is 0.578 which implies samples consuming

preserved foods at rare occasions are less likely to develop recurrent MI I comparison to consuming preserved foods twice a week.

SECTION 4.3: IDENTIFICATION OF PRECIPITATING FACTORS FOR RECURRENT MI AMONG THE GROUP.

Table 4.3.1: Odds ratio of clinical prognostic factors for recurrent MI

S.No	Clinical Prognostic Factors	Odds ratio
1	2 Episodes of anginal pain after thrombolysis	3.85
2	Blood Pressure 140-159/90-99	3.50
3	1 episode of anginal pain	2.79
4	NSTEMI	2.65
5	Blood pressure ≥160mmHg/≥100mmHg	2.64
6	Non-Transmural infarction	2.48
7	Treatment duration for HT>10years	2.37
8	BMI≥30	1.70
9	Chronicity of HT	1.571
10	Central obesity >85+ females	1.454
11	Co-morbidity – respiratory disease	1.394
12	Co-morbidity – renal disease	1.355
13	Central obesity>1+ index(males)	1.298
14	Chronicity of DM 6-10years	1.250
15	Treatment duration for DM 6-10 yrs	1.250
16	Hypertension	1.250

The above table indicates the precipitating factors for recurrent MI with regard to clinical prognostic factors in a descending pattern of odds ratio.

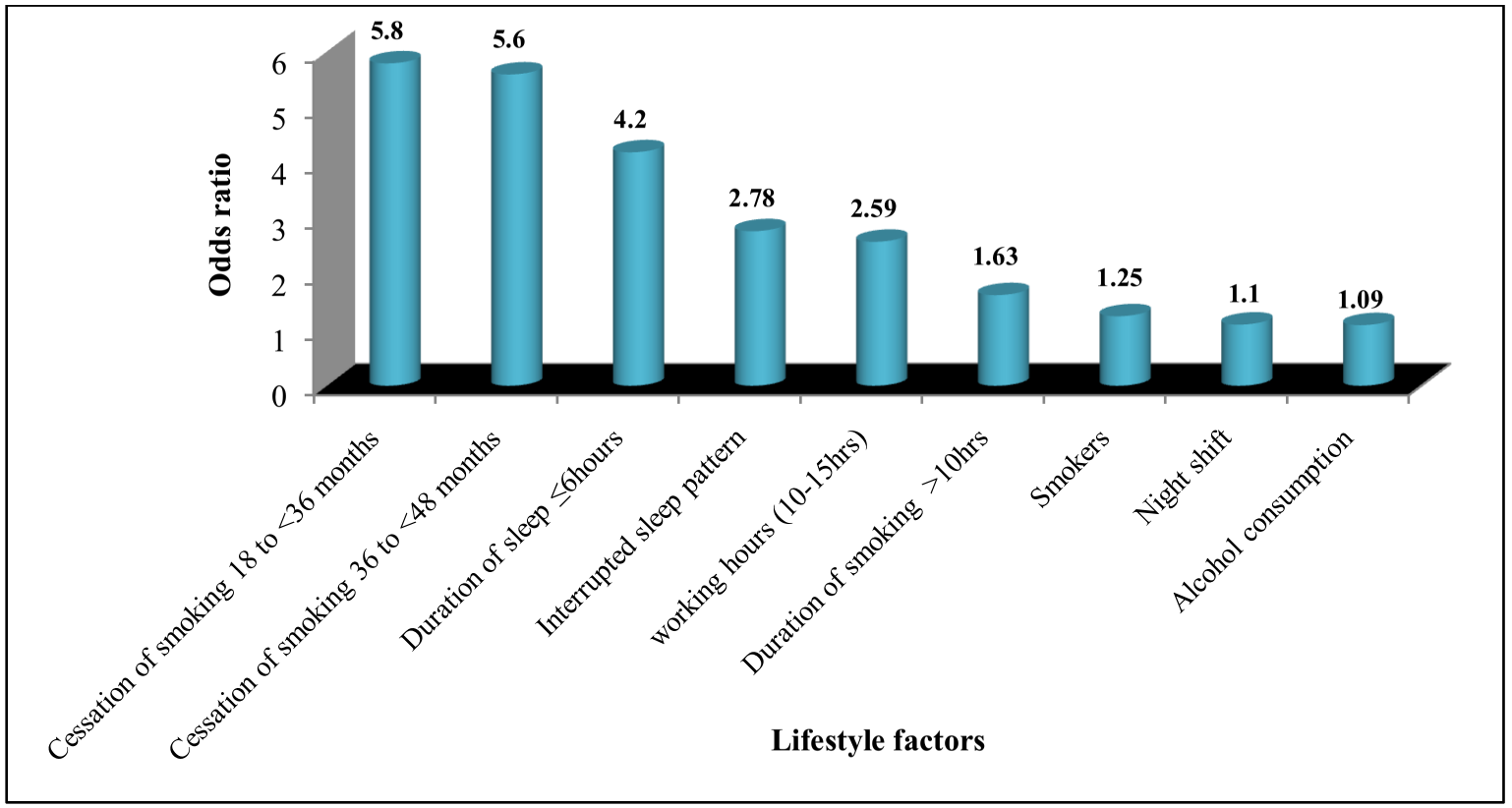


Fig 4.3.1Odds ratio of lifestyle factors for recurrent MI

The above figures shows the precipitating factors for recurrent MI with regard to lifestyle factors in a descending pattern of odds ratio

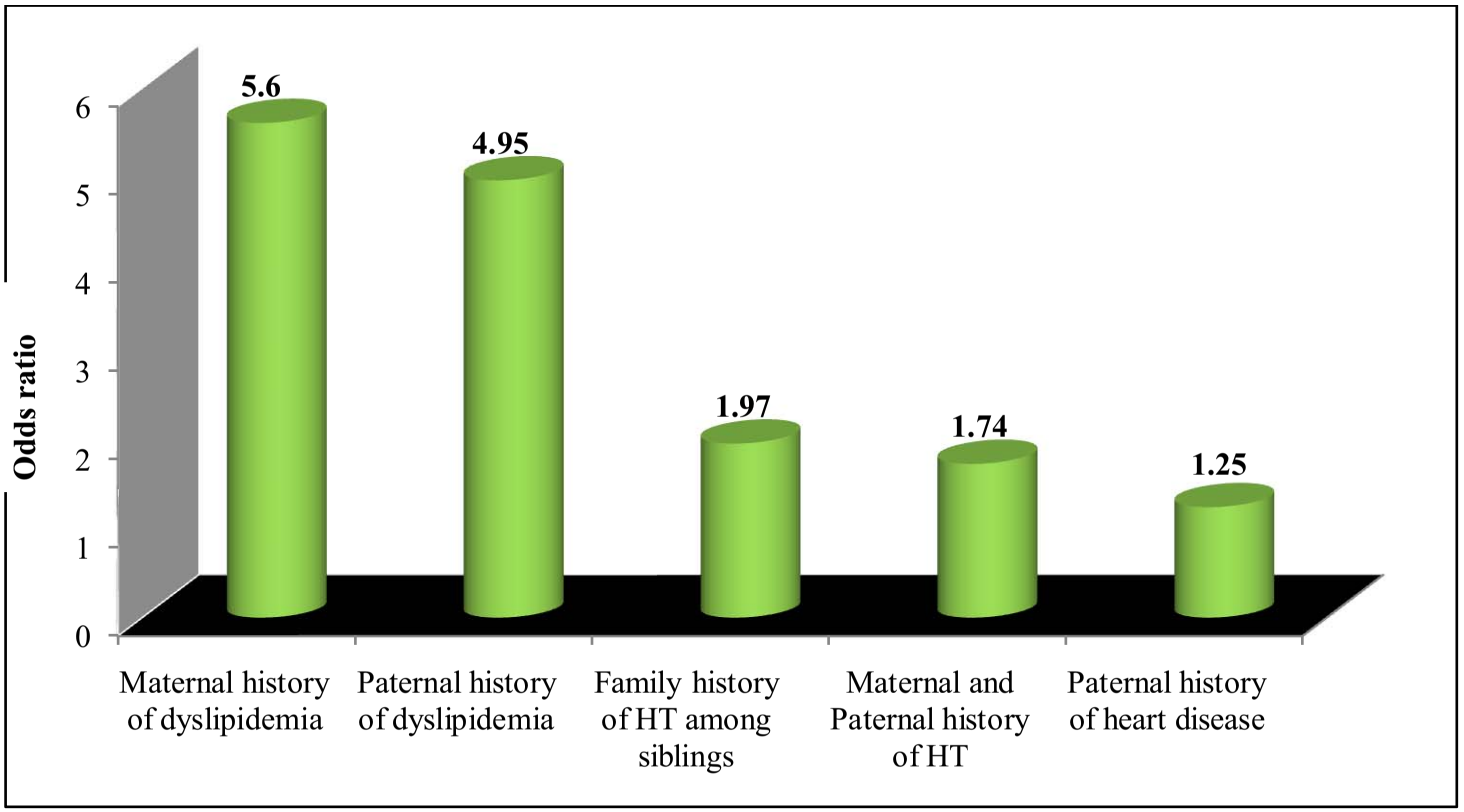


Fig 4.3.2 Odds ratio of genetic factors for recurrent MI

The above figure shows the precipitating factors for recurrent MI with regard to genetic factors in a descending pattern of odds ratio

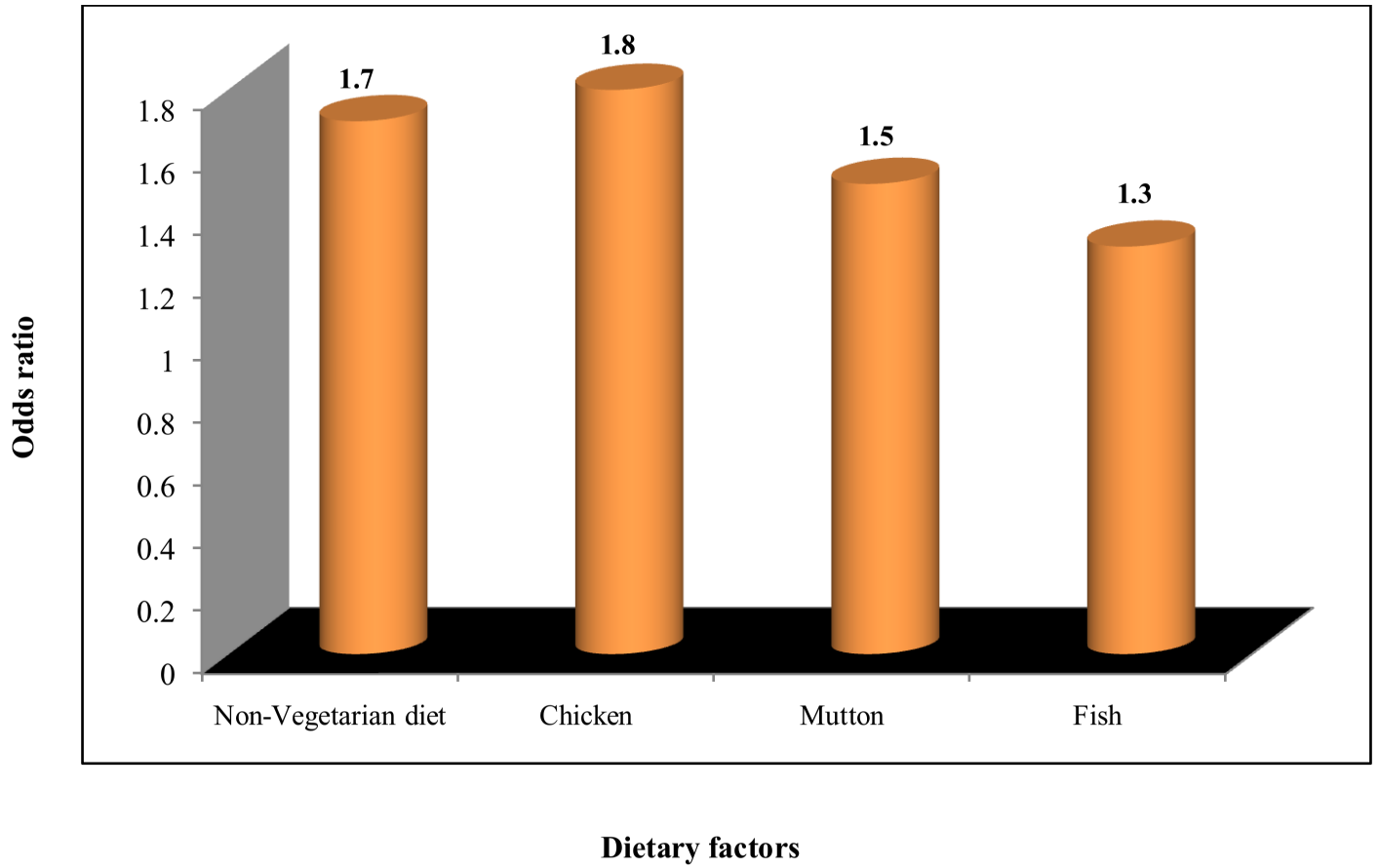


Fig 4.3.3 Odds ratio of dietary factors for recurrent MI

The above figure shows the precipitating factors for recurrent MI with regard to dietary factors in a descending pattern of odds ratio

CHAPTER 5

DISCUSSION

DISCUSSION

The study was conducted to identify the precipitating factors for recurrent MI. The discussion is based on the objectives, literature review and hypothesis specified in the study.

5.1 The findings of the demographic variables of the case and control group

The samples in case and contol group were males between age group of 51-60 yrs and have undergone higher secondary education. Most of the samples were technical workers, with a family income of >16,000 Rs and were married

5.2: The objective of the study was to find the association of selected clinical prognostic factor, genetic factors, life style factors and dietary factors

The chi square result of the above mentioned objectives are as follows,

5.2.1 Clinical prognostic factors:

It includes factors like Diabetes mellitus Hypertension, episodes of angina pain during hospitalization, participation in rehabilitation programme, body mass index, central obesity, , non-adherence to drug therapy, type of infarction, location of infarction, history of co-morbid illness.

5.2.1 (a) Diabetes Mellitus

The analysis in the table no. 4.2.1(a) shows significant association between duration of diabetes mellitus and recurrent MI at $p<0.05$.

The pathogenesis behind this factor is diabetic patients have impaired fibrinolytic potential, higher platelet aggregability, and higher fibrinogen levels. These hematologic factors exposure for a longer duration contributes to recurrent infarction, a common complication among diabetic individuals.

This findings was supported by **Kenneth.J.Mukamal .et al .,** conducted a prospective cohort study to assess the impact of diabetes on recurrent myocardial infarction and its comparability of risk with prior myocardial infarction. A total of 399 patients records were reviewed by trained officers and face to face interviews with patients. The results implies the

effect of diabetes was not significantly modified by age, smoking, household income, use of thrombolytic therapy, type of hypoglycemic treatment, but the risk associated with diabetes was its duration.

5.2.1 (b) Hypertension

The analysis in the table 4.2.1 (b) shows a significant association between duration of hypertension and recurrent MI at $p<0.05$.

The analysis in the table 4.2.5 (a) shows a significant association between blood pressure and recurrent MI at $p<0.05$ with a corresponding odd's ratio 0.748 which indicated normotensive is a protecting factor against recurrent MI

The mechanism was explained by Claudio Picariello et al., in a study to assess the impact of hypertension on patients with acute coronary syndromes, being chronic hypertensive state causes cardiac hypertrophy which is an independent risk factor for myocardial infarction. Left ventricular hypertrophy is associated with increased oxygen demand leading to the development of collateral circulation to supply the myocardium. This collateral circulation, driven by pressure gradient results in more exposure to ischemia and infarction which subsequently leads to recurrent events.

5.2.1 (c). Episodes of angina pain during hospitalization

The analysis in the table 4.2.1 (c) shows association of case and control group with their episodes of angina pain.

With regard to episodes of angina pain, there is a significant association between number of episodes and recurrent MI at the level of $p<0.05$, and the corresponding odds ratio is 0.644. This implies that patient with less than 3 episodes of anginal pain after incident MI are a protective factor for recurrent MI.

The mechanism which relates episodes of angina pain with recurrent MI is that the infracted artery reocculdes following a fibrinolytic therapy.

The result was supported by a study conducted by **Alon Marmor, et al.,(2009)** from MEDLINE databases of prospective studies, in August 2009, analysis of the study shows that ≥3 episodes of anginal pain during hospitalization was significantly associated with recurrent MI.

5.2.1 (d) Rehabilitation programme

The analysis in the table 4.2.1 (d) shows a significant association between participation in rehabilitation programme and recurrent MI at $p<0.05$ with corresponding odd's ratio 0.441. The result implies rehabilitation programme is a protective factor against recurrent MI.

The findings was supported by a study conducted by **Harbman .P (2010),** to study the effect of secondary prevention programmes for coronary artery disease on reduction of recurrent MI and mortality using metaanalysis. 63 randomized control trial studies were selected based on inclusive criteria. The result showed a significant reduction in recurrent MI and mortality in patient who received secondary intervention programmes.

5.2.1 (d) Revascularization procedure

The analysis in the table 4.2.1 (f) shows a significant association between revascularization procedures and recurrent MI at $p<0.05$ with a corresponding odd's ratio 0.287 which implies revascularization procedure is a protective factor against recurrent MI.

The mechanism behind this is revascularization procedures has very less possibility for reocclusion.

The findings was supported by a study conducted by **Gregg w. Stone et al.,(2010)** to examine the occurrence of recurrent MI after thrombolysis using randomized control trials. 81 patients who underwent intracoronary thrombolysis records were reviewed, out of which 36 patient had recurrent MI. The study suggested the need for a more definitive revascularization strategy for acute myocardial infarction.

5.2.1 (f) Location and Type of infarction

The analysis in the table 4.2.1 (f) shows a significant association between type of infarction and recurrent MI at $p<0.05$ with corresponding odd's ratio 2.658. This indicates that patient with NSTEMI is a precipitating factor for recurrent MI.

The mechanism behind this is patient with NSTEMI have associated co-morbid illness and it is due to partial occlusion of major coronary arteries or minor branches of coronary arteries.

The analysis in the table 4.2.1 (f) shows a significant association between location of infarction and recurrent MI at $p<0.05$ with corresponding odd's ratio 2.488. This implies patient with nontransmural location is a precipitating factor for recurrent MI.

The findings was supported by a study conducted by **Alon Marmor et al., (2009),** the sample included 350 patients with acute MI, initial 200 patients were considered training set and next 100 patients taken for test set. The two sets were compared with 14 clinical characteristics. In the training set, the incidence of recurrent infarction was 43% after non-transmural and 8% after transmural infarction. Similar values were obtained in the test set in 150 new patients, where the incidence of recurrent infarction was 40% after a non transmural infarction, compared with only 10% after an initial transmural infarction.

5.2.2 Genetic factors

5.2.2 (a) Family history of dyslipidemia

The analysis in the table 4.2.2 (a) depicts a significant association between family history of dyslipidemia and recurrent MI at $p<0.05$.

5.2.3 Life style factors

5.2.3 (a) Leisure time

The analysis in the table 4.2.3(b) depicts a significant association between leisure time and recurrent MI at $p<0.01$.

5.2.3 (b) Sleep pattern

The analysis in the table 4.2.3 (a) shows a significant association between sleep pattern and recurrent MI at $p<0.05$ with corresponding odd's ratio 0.360. It indicates uninterrupted sleep is a protective factors for recurrent MI.

The same table depicts significant association between duration of sleep and recurrent MI at $p<0.01$ with corresponding ratio 5.438. It indicates lesser duration of sleep is a precipitating factor for recurrent MI

The findings was supported by a study conducted by **Leineweber et al., (2009)** identified the effect of poor sleep and risk of recurrent events with coronary disease among middle-aged women. All women patients under 65 were selected and followed up between 1994 -2000 for recurrent events. Quality of sleep, restorative function of sleep, and snoring were assessed by the Karolinska Sleep Questionnaire (KSQ). Results indicate that poor sleep and sleep without a restorative function are associated with recurrent coronary events.

5.2.3 (c) Duration of smoking

The analysis in the table 4.2.3(d) shows a significant association between the groups with regard to duration of smoking and recurrent MI with corresponding odd's ratio is 0.274. This indicates patient exposed to lesser duration of smoking are less likely to develop recurrent MI.

The mechanism behind this factor is prolonged exposure increases the risk of atherosclerosis in major coronary arteries and its branches.

5.2.3 (d) Habit of exercise and its duration

The analysis in the table 4.2.3(f) depicts a significant association between exercise duration and type of exercise against recurrent MI at $p<0.05$ between case and control group. The corresponding odd's ratio is 0.167 for duration of exercise. This indicates patient engaging in exercise for more than 15hrs per week are at decreased risk for developing recurrent MI.

5.2.4 Dietary factors

5.2.4 (a) Intake of Green leafy vegetables

The analysis in the table 4.2.4(a) shows a significant association with regard to intake of greens between case and control group. The odds ratio, 0.075 for the intake of green leafy vegetables indicates it as a protective factor against recurrent MI

5.2.4 (a) Salt intake

The analysis in the table 4.2.4 (b) depicts a significant association between salt intake and recurrent MI at $p<0.01$

5.2.4 (b) Sugar intake

The analysis in the table 4.2.4 (b) indicates a significant association between sugar intake and recurrent MI at $p<0.05$

5.2.4 (c) Cooking style

The analysis in the table 4.2.4(b) depicts a significant association between cooking style and recurrent MI at $p<0.05$ between case and control group.The result indicates that boiling is a protective factor for recurrent MI.

Hence **RH_1** which was stated that **there is a significant association of selected factors between case and control group** was **accepted** for;

- Chronicity and treatment for DM
- Chronicity of HT
- Episodes of angina pain after thrombolysis
- Rehabilitation programme
- Duration of health check ups
- Family history of dyslipidemia
- Leisure time/day
- Sleep pattern and duration of sleep per night
- Duration of smoking
- Duration and type of exercise
- Green leafy vegetables
- Cooking style

- Sugar and salt intake
- Blood pressure
- Revascularization procedure
- Type and location of infarction

and rejected for other factors.

5.3: The objective of the study was to identify the precipitating factors for recurrent MI among the group.

The precipitating factors which were identified includes

5.3.1 Clinical Prognostic factors

- Episodes of anginal pain after thrombolysis
- Blood Pressure 140-159/90-99
- NSTEMI
- Non-Transmural infarction
- Treatment duration for HT>10years
- BMI≥30
- Chronicity of HT
- Central obesity
- Co-morbidity – respiratory disease & renal disease
- Chronicity & treatment duration of DM 6-10years
- Hypertension

5.3.2 Life style factors:

- Cessation of smoking less than 36 months
- Duration of sleep ≤ 6 hours
- Working hours (10-15hrs)
- Duration of smoking >10 years
- Smoking habit
- Night shift
- Alcohol consumption

5.3.3 Genetic factors

- Maternal & paternal history of dyslipidemia
- Maternal, Paternal & sibling history of HT
- Paternal history of heart disease

5.3.4 Dietary factors

- Non – vegetarians
- Non-veg foods– chicken, mutton & fish

5.4 The protective factors identified includes,

- Rehabilitation programme
- Habit of doing exercise & its duration
- Intake of green leafy vegetables

Hence the research hypothesis **RH_2: There are significant precipitating factors for recurrent MI among the group** was **accepted** for the above mentioned factors and rejected for the others.

CHAPTER 6

SUMMARY, CONCLUSION, IMPLICATIONS, RECOMMENDATIONS AND LIMITATIONS

SUMMARY, CONCLUSIONS, IMPLICATIONS, RECOMMENDATIONS AND LIMITATIONS

6.1 SUMMARY

Myocardial Infarction is the most common cause of mortality and morbidity which accounts for 32% death in India. According to WHO, survivors of MI are at increased risk of recurrent infarctions and have an annual death rate of 5%. It is the consequence of large population and high prevalence of cardiovascular risk factors. There is a widespread acceptance of the benefits of secondary prevention (i.e.) preventing recurrent infarction in patients with established MI. Secondary prevention is positioned at the boundary between prevention and treatment. Nurses are more influential among health care team in secondary prevention by assessing precipitating factors and educating the MI survivors.

The objectives of the study was

1. To associate the selected factors such as clinical prognostic factors, genetic factors, life style related factors and dietary factors between the case and control group.
2. To identify the significant precipitating factors for recurrent MI among the group.

The hypotheses formulated were

RH_1: There is a significant association of selected factors such as clinical prognostic, genetic, life style and dietary factors between case and control group.

RH_2: There are significant precipitating factors for recurrent Myocardial Infarction among case and control group.

The investigator has strongly rooted the study with extensive review of literature, professional experience and proficient guidance from the field of Medical-Surgical Nursing. It also provided strong foundation for the study, including integrating theories into conceptual framework, selecting the research design and patients and developing the tool for data collection.

The researcher adopted case control design to identify the precipitating factors for recurrent MI among patients attending cardiac OPD at FLL Hospital, Chennai. Betty Neuman's System model was adopted for the conceptual framework, which endowed a comprehensive framework for identifying the precipitating factors for recurrent MI.

The content validity for the data collection tool was obtained from an interventional cardiologist, intensivist, 3 nursing experts and a biostatistician. The reliability of the tool was assessed using inter-rater method and the feasibility was analyzed by conducting a pilot study at FLL Hospital for both case and control group. The report obtained from the pilot study supported the investigator's plan to proceed for the main study.

The main study was conducted at Frontier Life Line Hospital, Chennai for both case and control group. Non probability purposive sampling technique was used and the sample size was 117(case -56, control – 61). The samples were selected based on the inclusion and exclusion criteria. Ethical principles were strictly followed throughout the study.

The data collected was analyzed and interpreted using descriptive and inferential statistics based on the formulated objectives and hypothesis. The findings revealed that there were significant precipitating factors for recurrent MI among the group.

The major findings of the study

There is a significant association of selected factors between case and control group, they were as listed below:

- Chronicity and treatment for DM
- Chronicity of HT
- Episodes of anginal pain after thrombolysis
- Rehabilitation programme
- Duration of health check ups
- Family history of dyslipidemia
- Leisure time/day
- Sleep pattern and duration of sleep per night

- Duration of smoking
- Duration and type of exercise
- Green leafy vegetables
- Cooking style
- Sugar and salt intake
- Blood pressure
- Revascularization procedure
- Type and location of infarction

The significant precipitating factors identified among the group was:

5.2.1 Clinical Prognostic factors:

Episodes of anginal pain after thrombolysis, Blood Pressure 140-159/90-99, NSTEMI, Non-transmural infarction, >10 years chronicity & treatment duration for HT, BMI ≥30, central obesity, respiratory & renal disease as co-morbid illness and 6-10years chronicity & treatment duration of DM.

5.2.2 Lifestyle factors:

Cessation of smoking less than 36 months, duration of sleep ≤ 6 hours, working hours (10-15hrs), duration of smoking >10 years, smokers, night shift, alcohol consumption.

5.2.3 Genetic factors

Maternal & paternal history of dyslipidemia, maternal, paternal & sibling history of HT and paternal history of heart disease.

5.2.4 Dietary factors

Non – vegetarians and type of non-vegetarian foods– chicken, mutton & fish

5.3 The protective factors identified includes,

Rehabilitation programme, habit of doing exercise & its duration & intake of green leafy vegetables.

6.2 CONCLUSION

The present study aimed at identifying the precipitating factors for recurrent MI. Through this the researcher desires to communicate that these precipitating factors should be focused upon in the preparation of assessment formats for identifying the risk for recurrent MI. Prioritizing on the control of these factors should be a core component of the health education provided to MI affected patients by health care providers as an essential step towards secondary prevention of MI.

6.3 IMPLICATIONS

The researcher has drawn the following implications from the study, in the field of nursing practice, nursing administration, nursing education and nursing research.

6.3.1 Nursing Practice

Nurses being a vital part of the health care team, hold responsibility in assessing and educating patients for the prevention of recurrent MI. Hence they are in need of knowing the precipitating factors in order to reduce the rising burden of recurrent MI. The means are as follows,

- To motivate and/or facilitate engagement of MI patients, who have greater need for risk factor modification and support, in cardiac rehabilitation programmes.
- To initiate and sustain interventions that lower risk of recurrent MI from the initial phase of cardiac rehabilitation.
- To implement nurse-led short-term secondary prevention programmes against recurrent MI.

6.3.2 Nursing Education

- Nursing curriculum should include all the risk assessment strategies related to cardiovascular disease along with three modes of preventions.
- Student nurses should be trained in assessing and educating public regarding risk for recurrent MI and its prevention.
- Nursing students should be encouraged to utilize evidence based guidelines in caring for MI patients.
- Conduct seminars, workshops and conferences for students related to advancement in primordial and secondary prevention strategies in order to enhance their knowledge and skill in caring patients with MI.

6.3.3 Nursing Administration.

- In community effective risk assessment programmes should be conducted for patient with incident and recurrent MI.
- The nurse administrators in the hospital should design a clinical log for all in- patients with incident and recurrent MI to enable hospital staff to make entry whenever education about secondary prevention of MI is given..
- Utilize evidence based guidelines to plan training programmes for both hospital and community health personnel.
- Collaborate with governmental and non-governmental organizations to create policies and to conduct awareness programme on secondary prevention of MI.

6.3.4 Nursing Research

As a nurse researcher,

- The identified precipitating factors can be incorporated in framing assessment criteria to screen for recurrent MI risk.
- Standardization of the above specified tool can be done through further research, on larger MI population, to measure the validity and reliability of the tool.

6.4 RECOMMENDATIONS

The investigator recommends,

Communication of the study findings and its significance to hospital authorities to enable its incorporation into the assessment and rehabilitation component of MI patients at FLL Hospital.

1. Developing assessment criteria for identifying risk for recurrent MI and utilizing it in hospital and community settings.
2. Nurse-led short–term secondary prevention programmes with focus on controlling the identified precipitating factors can be incorporated as a component of cardiac rehabilitation in hospitals
3. Utilization of the study findings in formulating health education sessions for MI patients in hospitals and community health centres.
4. To conduct similar study among rural population and also on larger groups for greater generalization of results.

6.5 LIMITATIONS

The investigator found difficulty in

- getting larger samples
- getting previous records from samples
- matching variables among groups

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APPENDICES

APPENDIX - C

LETTER SEEKING EXPERT'S OPINION FOR CONTENT VALIDITY

From,

Mrs.S.Pichammal

M.sc(N) I year,

Omayal Achi College of Nursing,

Puzhal, Chennai

To,

Respected Sir/Madam,

Sub: Requisition for expert opinion for content validity.

I, **Mrs.S.Pichammal,** am doing my M.Sc Nursing, specializing in Medical Surgical Nursing at Omayal Achi College of Nursing during May 2014-2016, under the guidance of Dr.Mrs.Kanchana, Principal and Research Director, ICCR and speciality guide Mrs.Jose Eapen Jolly Cecily. As a part of my research project to be submitted to the Tamil Nadu Dr. M.G.R. Medical University, Guindy, Chennai, in partial fulfillment of the requirement for the award of M.Sc(N) degree, I have proposed to conduct a **"A Case control study to identify the precipitating factors for Recurrent Myocardial Infarction at selected settings, Chennai".**

I have enclosed my data collection tool for your expert guidance and validation. Kindly do the needful.

Thanking You,

Yours faithfully,

(S.PICHAMMAl)

ENCLOSURES:

1. Content validity requisition form
2. Research proposal
3. Data collection tool
4. Certificate for content validity

LIST OF EXPERTS FOR CONTENT VALIDITY

MEDICAL EXPERT

1. **Dr. Joy Thomas**
   Consultant cardiologist,
   Frontier Life Line Hospital,
   Mogaippair, Chennai
   Tamil Nadu.

2. **Dr. P.Ramamoorthy**
   Consultant Cardiologist,
   Sir Ivan Stedford hospital,
   Ambattur, Chennai.
   Tamil Nadu.

MEDICAL SURGICAL NURSING EXPERT

3. **Mr. Gopichandran**
   Lecturer,
   All India Institute of Medical Science,
   New Delhi.

4. **Prof.(Mrs). Malarvizhi**
   Vice Dean
   Pondicherry Institute of Medical Science,
   Pondicherry.

5. **Mrs. Chandralekha**
   Associate Professor
   Indirani College of Nursing
   Sri Venkateshwara Medical College,
   Ariyur, Pondicherry.

CERTIFICATE FOR CONTENT VALIDITY

This is to certify that the data collection tool developed by **Mrs.S.Pichammal,** M.Sc (Nursing) I year student (May 2014-2016) of Omayal Achi College of Nursing, as part of the research project, **"A Case control study to identify the precipitating factors for Recurrent Myocardial Infarction at selected setting, Chennai"** to be submitted to the Tamil Nadu Dr. M.G.R. Medical University, Guindy, Chennai, in partial fulfillment of the requirement for the award of M.Sc(N) degree, is validated by the undersigned and she can proceed with this tool to conduct the main study.

Signature with date:

Seal:

APPENDIX – D

CERTIFICATE FOR ENGLISH EDITING

TO WHOMSOEVER IT MAY CONCERN

This is to certify that the dissertation work **"A Case control study to identify the precipitating factors for Recurrent Myocardial Infarction at selected setting, Chennai"** prepared by **Mrs. S.Pichammal,** M.Sc Nursing II year student of Omayal Achi College of Nursing, Chennai, under the guidance of Prof.(Mrs).Jose Eapen Jolly Cecily has been edited for English language appropriateness by _____.

Signature with Date:

Seal:

APPENDIX – E

INFORMED CONSENT REQUISITION FORM

Good morning,

I Mrs. S.Pichammal., M.Sc.(Nursing) II year student from Omayal Achi College Of Nursing, Chennai, conducting "A Case Control study to identify the precipitating factor for recurrent myocardial infarction at selected setting, Chennai" as a partial fulfillment of the requirement for the degree of M.Sc. Nursing under the Tamil Nadu Dr. M.G.R Medical University.

I assure you that information provided by you will be kept confidential. Hence I request you to kindly cooperate with me and participate in this study by giving your frank and honest responses to the questions being asked.

Thank you

Signature of the investigator

Mrs. S.Pichammal

INFORMED CONSENT FORM

I understand that I am being asked to participate in a research study conducted by **Ms.S.Pichammal**., M.Sc(Nursing) student from Omayal Achi College of Nursing, Puzhal, Chennai. This research study will identify "**Precipitating factors of Recurrent Myocardial Infarction at selected setting, Chennai".** If I agree to participate in the study, I will be asked series of questions by structured interview schedule to know the demographic variable and to identify the precipitating factors. The answers will be kept confidential. No identifying information will be included during the analysis process. I understand that there are no risk associated with this study.

I realize that I will be benefited by this study. I recognize that my participation in this study is entirely voluntary and I may withdraw from the study at any time I wish. If I decide to discontinue my participation in this study, I will be continued to be treated in the usual and customary fashion.

I understand that all study details will be kept confidential. However, this information may be used in nursing publication or presentations. If I need to, I can contact **Ms.S.Pichammal**, M.Sc Nursing student from Omayal Achi College of Nursing, Puzhal, Chennai-66. Phone No: 04426591617 at any time during the study. The study has been explained to me, I have read and understood the consent form, my entire doubts have been answered, and I agree to participate. I understand that I will be given a copy of this signed consent form.

Signature of the Participant Date

---------- --------

Signature of the Research Investigator Date

APPENDIX - F

PART A: Demographic Variables:

1. Age in years

2. Gender
   a. Male
   b. Female

3. Education
   a. Non-literate
   b. Primary
   c. Higher secondary
   d. Degree
   e. Others

4. Occupation
   a. Skilled
   b. Technical
   c. Professional
   d. Business
   e. Home maker
   f. Others

5. Family Monthly Income
   a. ≤ 5000
   b. 5001 – 10,000
   c. 10,001 – 15,000
   d. $\geq 15,000$

6. Marital Status
    a. Single
    b. Married
    c. Widow/Widower
    d. Separate
    e. Divorce
    f. Others

PART B

I. Clinical Prognostic Factor:

7. Episodes of Anginal pain during hospitalization (after thrombolysis.)
    a. No episode
    b. 1 episode
    c. 2 episodes
    d. ≥ 3 episode
    e. NA

8. Are you a diabetic?
    a. Yes
    b. No

If yes

9. Chronicity of Diabetes Mellitus?
    a. <12months
    b. 1-5 years
    c. 6-10 years
    d. >10years
    e. NA

10. Treatment duration
    a. <12months
    b. 1-5 years
    c. 6-10years
    d. 10years
    e. NA

11. Are you a hypertensive?
    a. Yes
    b. No

If yes

12. Chronicity of hypertension
    a. <12months
    b. 1-5years
    c. 6-10years
    d. >10years
    e. NA

13. Treatment duration
    a. <12months
    b. 1-5 years
    c. 6-10years
    d. 10years
    e. NA

14. Adherence to drug therapy
    a. Regular
    b. Irregular
    c. Discontinued

If irregular or Discontinued

15. Reason for drug non-compliance
    a. Expensive
    b. Alternative medical treatment
    c. side effect
    d. Others (specify)
    e. NA

16. Participated in Rehabilitation Programme
    a. Yes

b. No

17. Health check ups
    a. Regular
    b. Irregular
    c. Others (specify)
18. Duration of Health check ups
    a. Monthly once
    b. Every 3 months
    c. Every 6 months
    d. Yearly once

II. Genetic factors:

19. Family history of heart disease
    a. Paternal
    b. Maternal
    c. Both
    d. Sibling
    e. More than one
    f. Nil

20. Family history of Hypertension
    a. Paternal
    b. Maternal
    c. Both
    d. Siblings
    e. More than one
    f. Nil

21. Family history of Diabetes Mellitus
    a. Paternal

b. Maternal
c. Both
d. Siblings
e. More than one
f. Nil

22. Family history of Dyslipidemia

a. Paternal
b. Maternal
c. Both
d. Siblings
e. More than one
f. nil

III. Lifestyle factors:

23. Duration of working hour/day

a. ≤ 5 hrs
b. 5-10 hours
c. 10-15hours
d. ≥ 15 hours
e. NA

24. Do you work in night shift?

a. Yes
b. No

If yes

25. How many weeks per month?

a. <2 week
b. > 2 week
c. NA

26. Time spent for leisure activities/week.
    a. Nil
    b. <5 hours
    c. <10hours
    d. <15hours
    e. >15hours

27. Sleep pattern
    a. Uninterrupted sleep
    b. Interrupted sleep

28. Duration of sleep at night
    a. ≤ 6 hours
    b. 6-10 hours
    c. >10hours

29. Are you a smoker?
    a. Yes
    b. No

30. Current smoking status
    a. Active smoker
    b. Former smoker
    c. Quitter(after incident MI)
    d. NA

31. Duration of smoking.
    a. <3 years
    b. 4-6 years
    c. 6-8 years

d. >9years
e. NA

32. Duration of cessation
    a. 0 to <6months
    b. 6 to <18months
    c. 18 to <36months
    d. 36 to <48months
    e. 48 to 60 months
    f. NA

33. Number of cigarettes per day
    a. <2
    b. 3-5
    c. >6
    d. NA

34. Are you an alcoholic?
    a. Yes
    b. No

35. Type of drinker
    a. Regular
    b. Weekly
    c. Social occasions
    d. NA

36. Type of alcohol
    a. Wine
    b. Liquor
    c. Beer
    d. Others
    e. NA

37. How many types of alcohol do you take/day?

a. 1
b. 2
c. ≥ 3
d. NA

38. Amount of alcohol/day

a. ≤ 180 ml
b. 180 – 260ml
c. ≥260ml
d. NA

39. Do you have the habit of doing exercise?

a. Yes
b. No

If yes

40. Duration per week

a. ≤ 7 hours
b. 8 – 14 hours
c. ≥15 hours
d. NA

41. Types of exercise

a. Walking
b. Jogging
c. Aerobics
d. Yoga
e. NA

IV. Dietary factors:

42. Are you a
    a. Vegetarian
    b. Non-vegetarian
    c. Ova vegetarian

43. Frequency of Non vegetarian foods consumption
    a. Once a week
    b. Twice a week
    c. Thrice a week
    d. >4 times
    e. NA

44. Consumption of salt(tsp/day)
    a. ≤ 1
    b. 2
    c. 3
    d. ≥4

45. Consumption of sugar(tsp/day)
    a. ≤1
    b. 2
    c. 3
    d. ≥4

46. Type of red meat
    a. Chicken
    b. Mutton
    c. Beef

d. Pork
e. More than one
f. others
g. NA

47. Consumption of green leafy vegetables
    a. Once a week
    b. Twice a week
    c. Thrice a week
    d. More than three times a week
    e. Daily

48. Consumption of fruits
    a. Once a week
    b. Twice a week
    c. Thrice a week
    d. More than three times a week
    e. Daily

49. Frequency of Preserved foods consumption
    a. Daily
    b. >thrice a week
    c. Twice a week
    d. Once a week
    e. Rare

50. Cooking style of foods
    a. Boiling
    b. Deep frying

51. Consumptions of fried foods
    a. Once a week
    b. Twice a week

c. Thrice a week
d. More than thrice a week

V. Bio-physiological measures:

52. Body Mass Index = weight (kgs)

height in (m^2)

Height -

Weight -

a. ≤ 18.5
b. 18.5 – 24.9
c. 25-29.9
d. ≥ 30

53. Central obesity = waist circumference (cm)

Hip Circumference (cm)

Male:

a. 0.95 or below
b. 0.96 to 1
c. 1.0+

Female:

a. 0.80 or below
b. 0.81 to 0.85
c. 0.85+

54. Blood pressure

a. SBP 100-140mmHg & DBP:60-90mmHg
b. SBP 140-159mmHg & DBP:90-99mmHg
c. SBP ≥160mmHG & DBP≥ 100mmHg

VI. Record reviews

55. Any revascularization procedure done?
    a. Yes
    b. No

56. If yes
    a. Percutaneous Coronary Angioplasty
    b. Coronary Artery Bypass Grafting
    c. Both
    d. NA

57. Type of Infarction
    a. STEMI – ST elevation Myocardial Infarction
    b. NSTEMI – non ST elevation Myocardial Infarction

58. Location of Infarction
    a. Transmural
    b. Non- Transmural

59. Type of management for Diabetes Mellitus
    a. Oral hypoglycemic control
    b. Insulin
    c. Both
    d. Alternative medicine
    e. NA

60. Type of management
    a. Calcium channel blockers
    b. Beta blockers
    c. Both

d. Alternative medicine

61. Past history of
    a. Cerebrovascular accident
    b. Autoimmune disorder
    c. Heart disease

62. Autoimmune disorder
    a. Rheumatoid arthritis
    b. Systemic Lupus Erythematous
    c. Systemic Sclerosis
    d. NA

63. Heart disease
    a. Rheumatic heart disease
    b. Valvular disorders
    c. Others

64. Type of drug management for Hypertension
    a. B-Blockers
    b. ACE inhibitors
    c. Antiplatelets
    d. Others
    e. NA

65. Any other Co-Morbid illness
    a. Respiratory disease
    b. Renal problems
    c. Vascular disease

66. Respiratory Disease

a. Asthma
b. COPD
c. Sleep Apnea
d. Others

67. Renal Problems
a. Renal calculi
b. Infections
c. Others

68. Vascular Disease
a. Deep Vein Thrombosis
b. Varicose Vein
c. Bleeding Disorders
d. Others.

APPENDIX – H

BLUE PRINT

S.No	Content	Item	Total Item	Percentage %
1.	Demographic Variables	1-6	6	
2.	Clinical Prognostic factor i. Diabetes Mellitus ii. Hypertension iii. Drug compliance iv. Health check ups v. Rehabilitation programme	 1-4 1-3 1-2 1-2 1	12	19.05
3	Genetic factors	1-4	4	6.35
4	Life style factors i. Working hours ii. Sleep patten iii. Smoker iv. Alcohol v. Exercise	 1-4 1-2 1-5 1-5 1-3	19	30.16
5	Dietary factors	1-10	10	15.88
6	Bio-physiological measures	1-3	3	4.76
7	Record reviews	1-15	15	23.8
	TOTAL	**63**	**63**	**100**

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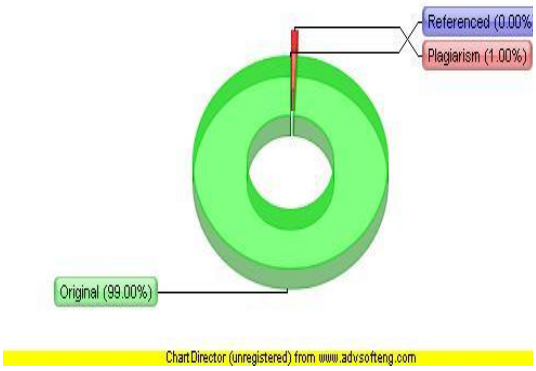

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APPENDIX – K

DISSERTATION EXECUTION PLAN - GANNT CHART																			
S.NO	**CALANDER MONTHS**	**Nov '14**	**Dec '14**	**Jan '15**	**Feb '15**	**Mar '15**	**Apr '15**	**May '15**	**June '15**	**July '15**	**Aug '15**	**Sep '15**	**Oct '15**	**Nov '15**	**Dec '15**	**Jan '16**	**Feb '16**	**Mar '16**	**Apr '16**
A	**Conceptual phase**																		
1	Problem identification																		
2	Literature review																		
3	Clinical fieldwork																		
4	Theoretical framework																		
5	Hypothesis formulation																		
B	**Design & planning phase**																		
6	Research design																		
7	Intervention protocol																		
8	Population specification																		
9	Sampling plan																		
10	Data collection plan																		
11	Ethics procedure																		
12	Finalization of plans																		
C	**Empirical phase**																		
13	Data collection																		
14	Data preparation																		
D	**Analytical phase**																		
15	Data analysis																		
16	Interpretation of results																		
E	**Dissemination phase**																		
17	Presentation or report																		
18	Utilization of findings																		
	Calendar months	**11**	**12**	**01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	09	10	11	12	13	01	02	**03**